



Universiteit
Leiden

The Netherlands

Sensemaking in crises: a study of collaborative governance between humanitarian response organizations and virtual & technical communities

Sabou, J.P.

Citation

Sabou, J. P. (2022, February 10). *Sensemaking in crises: a study of collaborative governance between humanitarian response organizations and virtual & technical communities*. Retrieved from <https://hdl.handle.net/1887/3274225>

Version: Publisher's Version

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/3274225>

Note: To cite this publication please use the final published version (if applicable).

Sensemaking in Crises: A Study of Collaborative Governance Between Humanitarian Response Organizations and Virtual & Technical Communities

Proefschrift

Ter verkrijging van
de graad van doctor aan de Universiteit Leiden
op gezag van rector magnificus prof.dr.ir. H. Bijl,
volgens besluit van het College voor promoties
te verdedigen op donderdag 10 februari 2022
klokke 10:15 uur

door

John Phillip Sabou

Geboren te Wenen
In 1985

Promotores

Prof. dr. E. Bakker

Prof. dr. S. Klein (WWU Münster, Germany)

Dr. S. Vidolov (WWU Münster, Germany)

Promotiecommissie

Prof. mr. dr. E.R. Muller

Prof. dr. B. van den Berg

Prof. dr. ir. G. Baltes (Hochschule Konstanz, Germany)

Dr. G.M. van Buuren

Dr. J.R. Ortt (TU Delft)

Printing: Gildeprint Enschede, gildeprint.nl

Layout and design: Sara Terwisscha van Scheltinga, persoonlijkproefschrift.nl

Copyright J.P. Sabou, 2022

All rights reserved, No parts of this publication may be reproduced without permission of the author.



Dit proefschrift is mogelijk gemaakt dankzij een financiële bijdrage van het Marie-Curie FP7- programma van de Europese Commissie.

PREFACE

The manuscript offers longitudinal research concerning the Collaborative Governance of disaster sensemaking between Humanitarian Response Organizations (HROs) and Virtual and Technical Communities (V&TCs). Over the past several years, the HROs have increasingly relied on new informational and social technologies to improve their disaster sensemaking with various methods, including crowdsourcing, crisis mapping, and blockchain funds. Between 2010-2016, these methods were shared by the V&TCs, an effort to stop-gap the enormous cost of developing new digital capacities internally.

The research focuses on the challenges to creating a conducive environment for producing information products that utilized 'big data' to inform decision-makers in humanitarian deployments. These ongoing challenges also illustrate a broader evolution of the humanitarian aid sector. It populates with more actors seeking to contribute to humanitarian agendas and add their perspectives and tools to aid delivery's informational and logistical affairs.

The research uses interview responses and supporting literature to sketch how collaborations were instantiated and sustained between the HROs and V&TCs. This data was then treated with the Collaborative Governance Model, which helped structure the findings into meaningful interpretations of how collaborations took shape and informed the environmental conditions that influence governance. The study contributes generalizable contributions to crisis management literature and the state of art of Collaborative Governance. It also offers insights into how the model can be useful in contemporary settings.

ACKNOWLEDGMENTS

The author acknowledges the Network for Information Technology & Innovation Management (NITIM) guidance by the European Commission FP-7 grant fellowship. Sincere gratitude is given to the promotion committee: Prof. Dr. Edwin Bakker, Prof. Dr. Stefan Klein, and Dr. Simeon Vidolov, whose guidance was instrumental in completing this manuscript. Special thanks are given posthumously to Prof. Bernard Katzy of the Bundeswehr University Munich. His leadership in bringing the NITM consortium together made it possible for this work to be realized.

Special thanks are also given to brilliant people at the United Nations Office for the Coordination of Humanitarian Affairs, the Digital Humanitarian Network (DHN), and the Crisis Mappers Community for pioneering the innovations that helped define the digital humanitarian phenomenon. Sincere gratitude goes to Andrej Verity, whose sponsorship and insight into the phenomenon was extremely valuable. Finally, I thank my family and friends for their support and patience throughout this study's development.

TABLE OF CONTENTS

1	Introduction & Literature Review	1
2	Theoretical Framework	27
3	HROs and V&TCs in Information Management for Humanitarian Aid	53
4	Epistemology	83
5	Analysis	105
6	Discussion	185
7	Conclusion	215
&	Bibliography / Appendices / Résumé	225

GLOSSARY OF TERMS AND ABBREVIATIONS

Actor

In this manuscript, the term substitutes the term stakeholder to indicate the non-committal nature of two or more organizations engaged in collaboration. In this way, actors represent either a formal actor, such as an HRO, or an informal actor, such as a V&TC. The qualification separating the formality from the informality is the legal standing classifying the formal actor as essential for decision making in a disaster.

Boundary Spanning

A communication activity by which individuals connect an organization to its environment. As experts, Boundary spanners collect information from the external environment and disseminate it via inter-organizational relationships, thus facilitating knowledge transfer and shared understanding.

CGM: Collaborative Governance/ Model

A theoretical perspective involves the governmental, community, and private sectors communicating with each other and working together to achieve more than any single sector could achieve on its own. Chris Ansell and Alice Gash developed a model to structure the analysis of the interface levels between one or more actors involved. It provides a theoretical approach that touches on collaboration's social complexity and how it is governed or leads to governance through mutual interdependence.

Crisis Management

The general organization and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies—preparedness, response, and recovery—reduce the harmful effects of all hazards, including disasters.

Disaster sensemaking

Sensemaking is the product of a system informing decision-makers about an ongoing situation and the possible influences that decisions might have on the outcome. The term is based on Karl Weick's definition of sensemaking in emergencies, whereby it is the cumulative construction of reality according to available or accepted faculties of situational cognition.

DHN: Digital Humanitarian Network

A Network-of-networks or consortium of Volunteer and Technical Communities (V&TCs) interfaced with Humanitarian Response Organizations between 2010-2017. The organization was created as a façade for coordinating the V&TCs in humanitarian crises. The DHN was explicitly created to represent V&TCs involved in disaster sensemaking and logistics.

Disaster Affected Communities Aid Beneficiaries

The term is used to describe individuals, groups, communities, and regional populations that have been affected by human-made or natural hazards. All humanitarian deployments carried out by the HROs are mandated to provide aid and relief services to these groups' benefit.

Facilitator

An individual that bridges the interactions between the HROs and V&TCs. They helped both networks understand their common objectives and assist them with plans to achieve these objectives by forming teams.

FIS: Field Information Service

The field Information Service is a cluster within the UNOCHA head office in Geneva, Switzerland. It is one of dozens of information management (IM) clusters assigned to provide informational support to UN-led humanitarian responses.

ICT: Information Communication Technology

ICT refers to technologies that provide access to information through telecommunications, internet access, and other digital mediums. It is similar to Information Technology (IT) but focuses primarily on communication technologies (e.g., mobile, internet, et cetera).

IM: Information Management

Information management (IM) concerns a cycle of organizational activity: acquiring information from one or more sources, the custodianship, distributing that information to those who need it, and its disposition through archiving or deletion. IM is virtually an organizational environment in which information professionals engage in disaster sensemaking.

Information Product

A term describes the desired final product of a collaboration with the V&TCs, typically in the form of a report or visualized map. It includes the niches and complex processes in which V&TCs perform crowdsourcing, crisis mapping, data aggregation, software development, and organize digital volunteers. It also represents new tools and new ways for organizing informational support to HROs.

HROs: Humanitarian Response Organizations

A term used to differentiate UN agencies and Red Cross organizations that've been mandated to govern the sector of humanitarian aid. The purpose of these HROs is to help manage and coordinate the informational and logistical processes of a humanitarian deployment in cooperation with the local government, NGOs, nonprofits, and state militaries that are directly involved.

Humanitarian Deployment

A UN term implies the emergency deployment of its agencies and the Red Cross and Red Crescent Movements to address aid and relief. The term also implies the subordination of all other organizations operating under humanitarian guidelines to the UN Cluster System as a condition for said deployment.

Social Brokerage

A process in which individuals called brokers act as intermediaries between individuals or groups who do not directly access each other. A crucial element of brokerage is the broker's monopoly of exchanges between separate domains. Their central position also confers power because they control information flows and communication between isolated groups or individuals.

Swift Trust

A form of trust occurring in temporary organizational structures, which can include quick starting groups or teams. It is often employed in social brokerage to incentivize interactions between two or more removed actors.

V&TCs: Virtual and Technical Communities

A term used to describe new types of organizations, networks, and groups that form in part or wholly through virtual environments. There are different purposes, but mostly they comprise data, aggregators, developers, technical experts, and digital volunteers. They offer HROs technical services in the form of digital capacities, often at no or low cost.

1

INTRODUCTION AND LITERATURE REVIEW

1. BACKGROUND

On 12 January 2010, a 7.0-magnitude earthquake rocked Haiti, devastating the capital of Port-au-Prince and nearby municipalities, killing or injuring more than 500,000 people, and displacing at least two million (IDMC, 2011). Consequently, international media coverage of the disaster and its response sent hundreds of aid organizations scrambling to arrive in Haiti as quickly as possible physically. Thus, the aid organizations had to act before gathering sufficient information about the disaster for a coordinated response effort (DARA, 2010). The inefficient and chaotic response to the Haiti disaster and the hierarchical models of information management also negatively impacted the organizations' coordination (Altay and Labonte, 2014).

A week after the earthquake, the largest telecommunication company in Haiti, Digicel, launched a free SMS number—4636—that would allow anyone in Haiti to text in their urgent needs directly to the inbox of a *Ushahidi* crisis map. The most avid users of the SMS feeds were Haitians in the United States who used the information to coordinate local response efforts on the ground (Meier, 2015). Soon enough, the mainstream media also caught wind of the efforts: The 'Haiti Crisis Map' was broadcast live on CNN and later featured on the BBC, in *The Washington Post* and *The New York Times*, on NPR, and other news outlets (*ibid*).

The Humanitarian Response Organizations or 'HROs' that led the global response quickly began using the Haiti Crisis Map to inform their efforts and identify critical logistical concerns for reaching the affected people. The use of SMS also changed the fundamental nature of coordination in the Haiti response. Information was no longer only passed through formal channels but also created and used by the disaster affected people. In other words, the receiving of disaster data directly from affected populations held the potential to enhance the aid organizations' sensemaking, allowing for more effective and coordinated efforts (Soden and Palen, 2014).

Sensemaking affects people's willingness to discard their initial view of a situation and adopt a newer view that is more sensitive to the particulars of the present context (Weick, 1995). One of Haiti's outcomes was the emergence of Virtual and Technical Communities or 'V&TCs.' Their digital humanitarians fundamentally altered the disasters' context by making sense of large volumes of open-source, ostensibly from social media platforms and smart devices. Patrick Meier (2015b) called this 'big data,' the massive volume of user-generated content publicly shared on social media platforms like Facebook, Twitter, Instagram, and YouTube" (p. 211). In the Haiti response, the V&TCs acted as an aggregating and processing filter to user-generated content (Read, Taithe, Ginty, 2016). For example, V&TCs like

Ushahidi Inc. and the *Humanitarian OpenStreetMap Team (HOT)* became effective in combining crowdsourced volunteer support with online crisis mapping expertise and techniques (Altay & Labonte, 2014).

On the other hand, professional agencies such as the Humanitarian Response Organizations (HROs) of the United Nations (U.N.) and Red Cross and Red Crescent Movements did not have the resources to process big data (Gupta, Altay, and Luo, 2019). They relied on the V&TCs to match data from disaster-affected communities or aid beneficiaries to complement their traditional sensemaking toolboxes (Muhren and Van de Walle, 2010; Van de Walle, Brugghehans, and Comes, 2016). In this way, the HROs and V&TCs both possessed complementary capacities that needed to become more contextualized and efficient to inform disaster coordination (Van Gorp, 2014).

The research will take a particular focus on the HROs and V&TCs, as they have been the primary actors struggling to connect ‘big data’ to the information management processes necessary to coordinate humanitarian aid deployments. Therefore, information management is an important activity for sensemaking in crisis and coordinating all HROs’ activities. In the UNDAC Field Handbook, UNOCHA defines information management within its mandated responsibilities:

“To compile and analyze the information input from outside sources (...) and convert it into appropriate output format for dissemination to stakeholders” with the expected result of “provision of the timely output of analyzed information in an appropriate format” (United Nations, 2006, chapter E, p.18, Cited in Muhren and Van de Walle, 2009).

Over the past several years, the HROs have increasingly relied on new informational and social technologies to improve sensemaking with various methods, including crowdsourcing, crisis mapping, and blockchain funds (Barnett, 2013; Read and Taithe, 2016). For example, the American Red Cross has experimented with the ICTs to improve their situational awareness by providing disaster victims mobile phones and VISA cards to transfer money instead of just focusing on the standard “truck and dump” model of aid (Barnet, 2013, p. 388). This data can then track and monitor what the victims need the most based on their spending, potentially enabling further aid delivery activities.

Muhren and Van de Walle (2010) noted that the complexity of deriving importance from ‘big data,’ mainly social media data, is grounded in identity construction between organizations responding to disasters. “People learn about events when they compare what they see with what someone else sees and then negotiate some mutually acceptable version of what happened” (Ruggles, 2009, p. 250).

For instance, one of the practical solutions arising out of digital humanitarianism in Haiti, the *Humanitarian OpenStreetMap* community, mobilized around the extensive mapping needs of the response efforts in Haiti, creating an informal view of the disaster that was more contextual in contrast to the official data provided by the government of Haiti (Soden and Palen, 2014).

Haiti demonstrated the importance of getting accurate information through the interplay of sensemaking between HROs and V&TCs. That interplay is significant for understanding how big data becomes a part of coordination in humanitarian assistance. On the one hand, there is crisis management literature that focuses on the design of architectures and workflows aimed at channeling big data into coordinated relief (Starbird and Palen, 2011; Barnes, 2012; Goodchild and Li, 2012; O'Reilley, 2013; Hiltz, Kushma, Plotnick, 2014). On the other hand, research on the digital humanitarianism phenomenon has not extensively covered the interplay of collaboration in the challenges HROs and V&TCs encounter. This manuscript focuses on the latter approach.

1.1. Research Statement

There is existing literature on collaboration between HROs and V&TCs (Crowley, 2013; Van Gorp, 2014, 2015; Meier, 2015; Verity, 2015; Chernobrov, 2018). However, these have not fully explored the causes of the difficulties concerning optimizing the *Collaborative Process* between two large organizational networks. This manuscript contains research on how the HROs and V&TCs collaborate and structure their relations to improve information management to adapt or incorporate digital capacities for making sense of big data in disasters. The approach to studying this phenomenon is different from previous research because the manuscript takes an ethnographic perspective to focus on managing the collaborations between HROs and V&TCs rather than focusing solely on the technical issues of adapting big data to traditional disaster sensemaking. Therefore, the research questions for this research deal with three challenges:

Research Question #1: *How do HROs and V&TCs structure their collaborations?*

Research Question #2: *What are the underlying challenges for HROs and V&TCs to collaborate?*

Research Question #3: *How does governance form out of the collaborations of the HROs and V&TCs?*

1.1.1. Thesis Structure

The thesis is delivered in several chapters that are summarized this way:

Chapter One

The chapter offers a justification for the thesis, its nature, and relevance. It presents the problem statement and its background, the literary domain to which the research belongs (crisis management) its intersection with humanitarian aid. The chapter also introduces the research dealing with the digitalization of crisis management. These concern the utilization of big data in disaster sensemaking, digital humanitarianism, and the humanitarian aid sector. The chapter concludes with an intersection of these research tracks in Collaborative Governance, which concerns the need for more inclusive public/governmental alliances to resolve complex societal issues.

Chapter Two offers the conceptual framework and introduces the *Collaborative Governance Model* or 'CGM.' The model is adapted to understand how collaboration manifests between the HROs and the V&TCs. It also provides a literature review on the concepts of collaboration and Governance respective to the CGM.

Chapter Three presents the empirical setting, presenting the bureaucratic landscape of humanitarian aid. It provides a breakdown of the United Nations 'Cluster Approach', or 'Cluster System.' The chapter also addresses the roles and niches of both the HROs and V&TCs. Among these separate organizational communities, each had a representative responsible for coordinating both networks. These organizations are the United Nations Office for the Coordination of Humanitarian Affairs and the Digital Humanitarian Network. An introduction of the HROs and V&TCs, and the UNOCHA and DHN actors will be given in the chapter.

Chapter Four describes the research methodology used to structure the data and position the research's theoretical underpinnings. Specifically, the thesis presents a case study that sketches the collaborations between the HROs and V&TCs, drawing on *Semi-Structured/Structured Interviews*, *Narrative Analysis*, and *Thematic Coding*. The interviews' content is also treated with the theoretical view of 'social constructivism,' a genre of ethnographic research that assumes an interpretive stance to qualitative work. The choice of these methods is also justified in the chapter.

Chapter Five introduces the data presented via the CGM and focused on the social construction of collaboration as told through the semi-structured interviews and supporting literature. According to the CGM structure, the data is presented, focusing on the interplay or 'Collaborative Process' that occurred over a longitudinal period (2012-2016).

Chapter Six provides a discussion following the case study's findings and drawing on the theoretical approach: Collaborative Governance Model. It also offers discussion points about the literature.

Chapter Seven captures the concluding remarks and outlines the study's theoretical and practical implications with future research suggestions.

Scholars of crisis management have struggled to solve the disfunction between the usability of big data and the formalized processes of sensemaking, often called information management, during disasters, especially in humanitarian aid (Hughes and Palen, 2009; Steets et al., 2010; Starbird, 2013; Burns, 2013; Guan and Chen, 2014; Meier, 2015; Van de Walle and Comes, 2016). Consequently, this literature has attempted to understand how ICTs and new forms of sensemaking can impact coordination between actors and what that means for humanitarian aid's traditional bureaucracies. Therefore, to understand the context in which HROs and V&TCs can collaborate efficiently, the following sections are based on a literature review that deals with Humanitarian Aid as a non-profit sector, Crisis Management, and the Digitalization of Crisis management.

1.2. Characterization of Humanitarian Aid

Since the 1990s, the HROs have significantly globalized their abilities to provide aid and relief to distressed countries, as well as engaging social and political transformations led and funded by Western donor governments (Kendra and Wachtendorf, 2003; Brinkerhoff, 2009; Kennedy, 2012; Jackson, 2012; Barnett, 2013). The section contains a review of the humanitarian aid sector's evolution in the context of the concurrent research on digital humanitarianism and its impact on humanitarian affairs.

Over the past decade, the notion of humanitarian aid has evolved from an unregulated mission of charity involving a minimal number of actors to a massive non-profit sector of various NGOs, HROs, and other organizations (Clarke and Ramalingham, 2008). Consequently, there is significant literature on humanitarian aid and its challenges, particularly on the practices of aid culture (Hilhorst and Schmiemann, 2002), the political and social dynamics of humanitarianism (Minn, 2017), and the drive towards 'humanitarian innovation' (Betts and Bloom, 2014; Bessant, Rush and Trifilova, 2015).

The diaspora of humanitarian actors has dramatically increased since 2005, and with that increase, the purpose of humanitarian aid has also become increasingly contested. For instance, for-profit organizations compete with NGOs for government contracts (Stoddard, Harmer, and DiDomenico, 2009). Many corporations, including UPS, Walmart, Vodafone, and Google, have their philanthropic wings

that become more prominent (Barnett, 2013). Faith-based organizations, including megachurches in the United States and Islamic welfare societies, are increasingly present in chronically unstable regions (Barnett and Stein, 2012). Finally, new social technology groups like *Ushahidi* and *Crisismappers*, affectionately known as “geeks without bounds,” are changing the notion of humanitarian action (Liu, 2014, p. 25). These new actors are not necessarily bit players on the global stage or in particular emergencies but are providing most of the resources and doing a considerable amount of work (Ziemke, 2012).

In other words, the vast majority of humanitarian actors that’ve entered the sector over the past decade and a half are ‘informal’ actors. The reasons for this diversification are worthy of consideration and are probably comparable to the forces that drive much of globalization (Betts and Bloom, 2014). Of particular interest to this manuscript is how humanitarian aid is governed as structuring collaboration in uncertain environments is a critical problem between the HROs and V&TCs.

Humanitarian aid is uniquely governed in that the “professional humanitarians govern” (HROs)—according to Barnett (2013, p. 382). There is no overarching constitution or set of rules that would enforce a single framework for organizing responses to international crises and disasters. Instead, the HROs compete in what Polman (2010) calls the “humanitarian circus” (p. 12). Dunn (2012) has also characterized this as a combination of “organized chaos” and “adhocracy,” where the biggest and fittest actors are those that negotiate policy in temporary arrangements rather than set it for the long-term planning of future coordination efforts (pg. 39). In this view, humanitarianism does little more than lower the number of sacrifices demanded from any international order; in other words, this cannot stop unnecessary deaths and suffering, only reduce their magnitude (Bradol, 2004).

Humanitarian aid depends on a range of motivations driven by organizational pressures to continue operations, retain staff, and demonstrate publicly that the HROs are doing ‘good work’ (Collins et al., 2013, p. 2). Therefore, the humanitarian aid sector is interpreted as a cultural and spatial phenomenon that is best observed through an ethnographic study of different actors’ practices to discern the various drivers and dynamics of aid delivery. For instance, how humanitarian workers define and organize their work is influenced by their agency’s mission or mandate and their understanding of the context and assessment of the disaster’s scope (Jackson, 2012). These can also include the fears and anxieties of professional humanitarian workers themselves, e.g., aid workers, coordinators, information officers, et cetera (Duffield, 2010).

The International Committee of the Red Cross (ICRC) is illustrative in this respect. It aspires to persuade all potential actors to comply with international humanitarian law because it is the civilized thing to do (*ibid*). Thus, HROs trust their needs assessments and assist where the greatest needs are. To establish and maintain access to people affected by natural disasters or complex emergencies and deliver effective humanitarian aid, compliance with the ‘humanitarian principles¹’ is essential (UNOCHA, 2012). Humanitarian aid takes place in complex political and militarized environments, and the humanitarian principles distinguish humanitarian action from political, military, or other actors (*ibid*). In other words, HROs must promote the adherence to humanitarian principles for the effective coordination of aid. The commitment to these principles is expressed at an institutional level through the Code of Conduct for the International Red Cross and Red Crescent Movement and International Non-Governmental Organizations (INGO) in disaster relief (UNOCHA, 2012)

The HROs operate in complex and uncertain environments where conditions can pose considerable operational and management challenges. For instance, when these organizations decentralize their organizational components to function in developing countries, they result in headquarters and field offices geographically dispersed and reliant on temporary staff rotations (Collins et al., 2013). There is also a need for coordination within the network of the HROs and between their intra-organizational components. It also means paying attention to how they shape and interpret aid’s reality in a given context rather than the terms of their avowed policy aims (Metcalf, Griffen and Elhawary, 2011). In this formulation, humanitarian aid can be characterized as a network because organizations come together to accomplish particular and well-defined outcomes in temporary arrangements and often piecemeal (Slaughter, 2005; Collins et al., 2013).

As the humanitarian aid sector evolves bureaucratically, so do the technical aspects of sensing, monitoring, and collecting information about disasters, thus increasing the volume, variety, and velocity of data available (Gunasekaran et al., 2017). The increase in potential data also increases the visible contextualization of disaster-affected communities, which can be processed by ICTs and individuals with the skillset to collect and make sense of said data. For example, in 2013, in the Philippines, doctors and other volunteers came together to collect necessary donations from their internationally widespread circle of acquaintances via Facebook (Mauroner and Heudorfer, 2016). As in many other areas where the institutionalized system is deficient, grassroots movements arise, which try to counteract this

1 The humanitarian principles were derived from the International Committee of the Red Cross and the National Red Cross/Red Crescent Societies and endorsed in General Assembly resolution 46/182 (UN General Assembly, 1991).

insufficiency on the macro-level with simple methods on the micro-level. While many research strands look into this, the manuscript focuses on disaster settings' information management and the proliferation of digital humanitarianism.

1.3. Crisis Management Literature

The manuscript focuses on how HROs and V&TCs make sense of big data in humanitarian aid; this section covers the literature explaining the rise of big data through social media, crowdsourcing, digital humanitarianism. This literature is situated within the field of crisis management. Crisis management is a core component of humanitarian aid, especially dealing with coordination and information sharing in large disasters (Altay and Green, 2006; Salkowe and Chakraborty, 2009). With regard to coordination and information sharing, social media and smart devices offer better opportunities for two-way mediated communications, promising more detailed contexts of what disaster-affected people need (Fraustino, Liu and Jin, 2012; Reynolds, Seeger and Palenchar, 2012).

The crisis management field has several research tracks that deal with how information travels and how to coordinate different disaster management aspects (Comfort, 2007; Reynolds and Seeger, 2005, 2012; Coombs and Holladay, 2011). There is also much literature that focuses on the cognitive differences in collecting and processing information (Weick, 1993; 1995; Rosenthal, Boin, and Comfort, 2001) and how organizations reach shared understanding in crisis (Brändström and Kuipers, 2003; McFalls, 2010). Furthermore, collecting and processing information from various sources is essential for the decision-makers managing crises (Boin and Bynander, 2015; Boin and Kuipers, 2018). However, that information also poses significant management and policy dilemmas as the information sources also must be represented in the decision-making process. The digitalization of crisis managements includes a large diaspora of actors considered 'informal' or belonging outside the spectrum of formal agency stakeholders. They also bear "new rules, new systems, and new expectations to tide over the early period of an emergency" (Kendra and Wachtendorf, 2003, p. 53).

In the humanitarian aid sector, the processing and representation of big data through social media has appeared in discussions at the U.N. High-Level Panel on the Post-2015 Development Agenda's call for a 'data revolution' (Melamed and Cameron, 2015). Generally, there has been enthusiasm to champion the transformative potential of 'big data' synonymous with 'humanitarian innovation' concerning the digitalization of crisis management (Scott-Smith, 2016). Decision-makers now have access to new products and processes (logistical or evaluation systems), new positioning (the use of social media to generate publicity), and new paradigms (completely original ways of thinking about humanitarian problems) (Trompette and Cholez, 2015). However, access to all of those things requires

either significant development of ICT capacities within the HROs. They lack the donor-support and reforms to their mission mandates and organizational structures. Instead, collaborations are encouraged with V&TCs that have such capacities to outsource piecemeal some aspects of the HROs' information management.

Barnes (2013) noted that the "computational techniques and the avalanche of data become ends in themselves, disconnected from what is essential... are we generating useful knowledge or are we collecting data for data's sake (pgs. 297-312)"? With this in mind, many organizations understand that there is a vast technical and knowledge gap between their interest in big data and their traditional information management flows. Poblet and colleagues (2018) suggest two dominant approaches to studying how big data applies in crisis management: (i) data-oriented; (ii) communication-oriented. The former approach implies the need to capture and convert open-source data to actionable information, and it involves incorporating V&TCs into the wider humanitarian aid sector. Social network sites like Facebook have been acquiring terabytes of data every day in comments, blogs, tweets, photos, audio, and videos, among other forms. Organizations can process this data, analyze it and store it for intelligent decision-making to gain a highly competitive benefit (Fadiya, Saydam, Vany Zira, 2014).

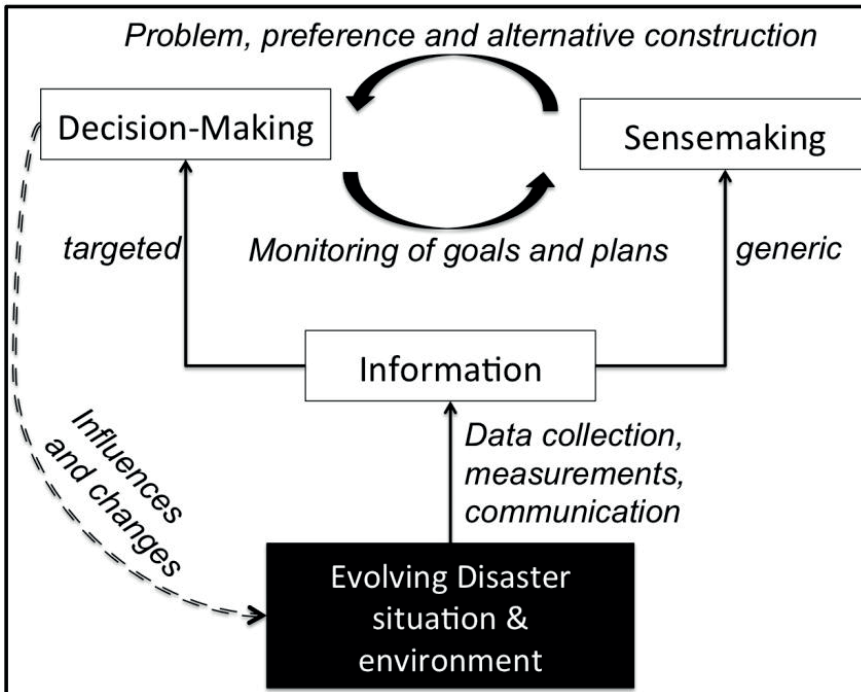
The problem that HROs face is that they neither have the capacity nor the resources to collect and sift through large volumes of data for valuable information. The influence question that comes up is how big data is processed, store, and managed and whether the V&TCs have been represented as legitimate sense makers. The following sub-sections will diverge into four research/literature tracks that focus on this manuscript's topic. These include the challenge of sensemaking in disasters, big data in decision-making, crowdsourcing technologies and methods, and the digital humanitarian phenomenon. Finally, these tracks converge in Collaborative Governance in crisis management, which focuses on the humanitarian aid sector and the interplay of collaborations between HROs and V&TCs.

1.3.1. Challenge of Sensemaking in Disasters

The global public, governments and HROs have been trying to adapt to the massively increasing amount of text, images, and video data available to analyze scientifically. For example, the social contribution of conflicts, political violence, and disasters are all digitalized through data streaming (ibid). The vast amount of data now available on the internet has improved the ability to deliver humanitarian aid to disaster-affected communities and empower them and digital humanitarians all over the globe in that process. That means widening the inclusivity of actors that can take part in disaster sensemaking.

Generally, sensemaking is the product of a system informing decision-makers about an ongoing situation and the possible influences that decisions might have on the outcome. Therefore, sensemaking is akin to information management. It takes generic data about an environment or subject (e.g., a disaster). It constructs a reality that the decision-makers can understand and act on based on the available information (See figure 1).

Figure 1: Sensemaking in Disasters



Source: Comes, 2015

The problem with this model is that it does not account for inclusivity. It assumes that all relevant information is sourced from a limited selection of stakeholders, e.g., a host government, NGOs, or the HROs themselves. However, this is rarely the case in disasters. There are often many sources with many perspectives about what is going on, making the decision maker's job to limit these perspectives' inclusivity and complexity. In organizational literature, sensemaking in disasters concerns not only how it is done, but by whom, as this has significant implications for actions to be taken (Schon, 1984; Weick, 1993). Karl Weick (1995) defines sensemaking according to seven properties:

Identity and identification are central – whom people think they are in their context shapes what they enact and how they interpret events (Weick, Sutcliffe, and Obstfeld, 2005; Thurlow and Mills, 2009).

Retrospection provides the opportunity for sensemaking that affects what people notice. Thus attention and interruptions to that attention are highly relevant to the process (Gephart, 1993).

Enactment of the environmental properties is constructed in dialogues and narratives (Bruner, 1991). As people speak and build narrative accounts, they organize their experiences and control and predict events to reduce complexity (Isabella, 1990; Weick, 1995).

Social activity: the audience for sensemaking includes “both individual and shared... products of conversation” (Currie and Brown, 2003, p. 565). Knowledge about a situational context is preserved, retained, or shared through stories to construct a sense of the situational context (Isabella, 1990; Watson, 1995; Maitlis, 2005).

Sensemaking is ongoing. Organizations simultaneously shape and react to the environments they face. As they project themselves onto this environment and observe the consequences, they learn about their identities and the accuracy of their accounts of the world (Thurlow & Mills, 2009). The feedback process so even as individuals deduce their identity from others' behavior towards them, they also try to influence this behavior. As Weick argued, “The basic idea of sensemaking is that reality is an ongoing accomplishment that emerges from efforts to create order and make retrospective sense of what occurs” (Weick, 1993, p. 635).

Extracted cues provide points of reference for linking ideas to broader networks of meaning and are ‘simple, familiar structures that are seeds from which people develop a larger sense of what may be occurring.’ (Weick, 1995, p. 50).

Plausibility over accuracy is favored in the accounting of events and contexts (Currie & Brown, 2003): “in an equivocal, postmodern world, infused with the politics of interpretation and conflicting interests and inhabited by people with multiple shifting identities, an obsession with accuracy seems fruitless, and not of much practical help, either” (Weick, 1995 p. 61).

These principles exist in crisis management and humanitarian aid as well. HROs have concerned themselves with the approximation of their beneficiaries' needs versus their actual accuracy. Bradol (2004) mentioned humanitarian aid is the systematic utilization of policy instruments to deliver disaster-affected communities with minimal burden to the international order (Barnett, 2013). For instance, the

United Nations generally promotes disaster sensemaking via unified and linear information management structures. These structures reduce the number of sense-makers by requiring the formality of an organizational or legal status from potential contributors (op cit. Nezih, 2015; Schofield, 2002).

The complexity of humanitarian aid (politics of aid delivery and sensemaking) and the prevalence of incomplete information in disasters overburdens the HRO's capacity to 'make sense' of the people's actual needs (Hiltz and Plotnik, 2013; Plotnick et al., 2015). Now imagine that V&TCs are thrown into the mix—these are mainly informal volunteer networks with little hierarchical organization or training as humanitarian or disaster professionals. Their capacities to deliver complex information products may be resourceful, but they also interrupt traditions in organizational sensemaking that reduce complexity.

When a significant crisis unfolds, it is a tremendous challenge to satisfy humanitarian responders' information needs and aid beneficiaries. Moreover, to develop the situational awareness needed to act, responders need information on what is required and what has already been done (Stanton et al., 2001). For this reason, maps are of great importance during crisis response (Meier, 2015). However, in rapidly urbanizing developing countries, existing maps and data sets held by governments or private firms tend to be of limited use if they are made available at all. As a result, existing data sets become quickly outdated and do not reflect people's experience of their current physical environment. Thus, mining social media for context about disasters directly from the affected communities has become a sought-after capacity among the HROs. However, they neither have the funding nor the support from their donors to develop such capacities themselves. Instead, that work was loosely outsourced to V&TCs between 2011-2016.

Tapia and colleagues (2011) also identified various challenges among the HROs, including organizational support for ICT and innovation amidst limited staff and resources. For example, during Hurricane Sandy, more than a million Instagram pictures and over 20 million tweets were posted within five days. In Japan, Twitter users posted more than 177 million disaster-related tweets the day after the 2011 earthquake—the equivalent of 2,000 tweets per second (Meier, 2015). These numbers meant that there was much information to be gleaned, but HROs could not collect and process them.

Disaster planners, responders, and researchers exhibit optimism regarding social media's potential to facilitate improved crisis management with the use of big data expand the options available to decision-makers with a broader view of the situation and in richer contexts (De Albuquerque et al., 2015; Read, Taithe, and Ginty, 2015). For instance, web-based social media offer a greater capacity, dependability, and

interactivity of data, which may be advantageous for emergency responders (Velev and Zlateva, 2012; Middleton, Middleton and Modafferi, 2013). The catch is that expanding this view also expands the inclusivity in sensemaking. Thus, digital humanitarians and aid beneficiaries could have a voice in decision-making, requiring new policies and organizational reforms to make way for such a general census.

Social media supports backchannel communications during a disaster, allowing for wide-scale interaction that can be collectively resourceful, self-policing, and generative of information that is otherwise hard to obtain (Leysia and Irina, 2007). It also enables users, especially disaster-affected communities, to create, share and consume information from the web through various increasingly ubiquitous technologies, e.g., smartphones, tablets, other human-centric devices (Starbird, 2012). There have been several studies that extensively covered how social media platforms, including Twitter, Facebook, Youtube, Instagram, and others, have enabled citizen-reporting and collaborative mapping of disasters using personal devices (Meier, 2013; 2015; Comes, Vybornova, Van de Walle, 2015; Meeters and Van de Walle, 2014; Tapia and Moore, 2014; Vieweg, Castillo and Imran, 2014).

1.3.2. Big Data in Crisis Management

In this manuscript, big data is used synonymously with open-source data that is made freely available, accessible for all to use as needed. The accessibility of big data facilitates empowerment for which activists have developed civic technologies and specialized applications. These run on open data platforms that aim to connect people to “improve public services or help citizens coordinate with each other to solve problems together” (Baack, 2015, p. 7). In other words, by opening up big data, citizens are expected to gain access to information that informs policies, strategies, and actions taken by governments, firms, and other organizations and become more actively engaged in the decisions that affect them (*ibid*). This perspective builds on the long-standing participation debate, aimed at fostering aid efforts that are more inclusive of the intended aid beneficiaries (Hickey and Mohan, 2004), which has also been addressed in ICT-enabled information exchange (Mulder et al., 2016).

Big data is a field that treats ways of systematically extracting information from or otherwise deal with data sets that are too large or complex to be dealt with by traditional data-processing methods (Oxford Dictionary, n.d.). There are four significant dimensions to big data: volume, variety, and velocity, veracity, to which HROs continue to struggle with as their lack of capacity to deal with big data have required them to seek the help of digital humanitarians that do (Qadir et al., 2016).

Big data is not merely found, and it is constructed in specific contexts (Tuomi, 1999). For instance, some organizations have embraced social media and mobile apps to issue alerts and provide updates for incidents (e.g., official Facebook and Twitter

accounts from fire services, rescue, civil protection organizations, et cetera). Quoting Shirky, “forming groups has gotten a lot easier... we now have communication tools that are flexible enough to match our social capabilities, and we are witnessing the rise of new ways of coordinating action that take advantage of that change” (op cit. Starbird 2012, p. 34; 2008, p. 18-20). The creation of [big] data through those social capabilities enables drawing on individual and community knowledge or a situation (Tuomi, 1999, p. 5). This local knowledge then undergoes several mutations as it is processed and transferred between different actors and made usable.

The velocity, variety, and volume of social media information—as a particular type of big data—can be leveraged in all phases of a crisis management lifecycle: preparedness, response, relief, and recovery (Poblet et al., 2014). Thus, significant data creation involves many choices and judgments and draws heavily on actors’ pre-existing knowledge and ways of sensemaking (Qadir et al., 2016). As data migrates from data originators to data processors, to data users, it is (re)interpreted in a series of different contexts by different actors that may be unfamiliar with the affected people’s individual and shared needs (Haworth and Bruce, 2015). In other words, the process of sensemaking requires multiple actors working together and agreeing together on what context the data is showing and what can be done about it.

Big data has many vectors but is most widely recognized via social media, broadly representative of web-based platforms and services that allow users to develop public or semi-public profiles and content (Blank and Reisdorf, 2012). For instance, well over a quarter-million messages were posted via SMS, Facebook, and Twitter in the first 72 hours after Typhoon Yolanda hit the Philippines in 2013 (Meier, 2015). The volume of the data produced about a disaster, especially by those who experience it first-hand, offers potentially useful information for emergency services and aid organizations. Figure 2 illustrates the potential uses of big data in humanitarian aid and how it expands complexity.

Collecting, structuring, and making sense of big data requires many technical activities that must be ongoing at any given time. Activities can include crowdsourcing, statistical processing or a data analysis algorithm, text classification, semantic analysis, context analysis, language-translations, software development, data aggregation et cetera (Tapia et al., 2011; Ngamassi, Maitland and Tapia, 2014). These methods are complicated to coordinate, especially since the capacity to do just one of these methods requires a full-time staff, significant digital architecture, ICTs, and sometimes hundreds of digital volunteers. In humanitarian aid, making sense of big data generally means creating a limited, functional data set from big data by filtering and processing existing verbalized information and by encouraging the creation of new data from hitherto unshared knowledge (Mulder et al., 2013).

The distinguishing feature of the activities mentioned above is that digital humanitarians exclusively do them. The resulting data sets that are collected are user-generated instead of a formal institution (Kaplan and Haenlein, 2010). Crowdsourcing, then, refers to both the social creation and filtering of big data for information that adds context and accuracy to disaster-affected communities' needs. The V&TCs discussed in this manuscript use crowdsourcing as the most ostensive example for collecting knowledge about the local impact of a disaster and the needs of the affected people (Mulder et al., 2013).

Some literature suggests the utility of big data is overstated, however. In humanitarian aid, for instance, "there is a sense in some quarters that there is a technological gold rush: alive to the possibilities ... but ignorant of the fact that we have been here before" (Read, Taithe, Ginty, 2016, p. 5). The concerns over the reliability of big data have persisted to this day. However, some argue that social media must include regular crisis management challenges that the promises of social media and ICTs are overstated (Li et al., 2014; Yan and Pedraza-Martinez, 2019).

Read, Tauthe, and Ginty (2016) explored the emphasis of innovation and technology to revolutionize humanitarian aid, especially in terms of gathering and using big data collected and processed by V&TCs. Simultaneously, this is part of the problem. Big data offers a lens for viewing information that has not been refined by formal processes and extends the context, complexity, and opinions about what is going on. Large-scale disasters are often chaotic and involve many organizations that require quick ways of discerning what is going on and control the information management flows to ensure accountability. With many HROs working separately and sometimes in contradiction to one another, much information is often collected in a short amount of time but not utilized or abandoned. This has led to challenges in applying and managing big data derived from social media and crisis management (Flanagin & Metzger, 2008).

1.3.3. Crowdsourcing Technologies and Methods

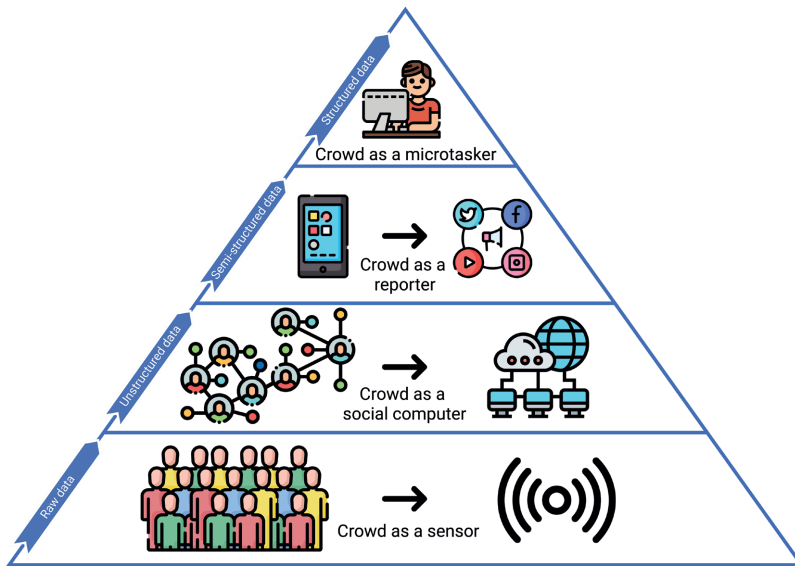
The term crowdsourcing was first coined by Jeff Howe (2008) when referring to the act of taking a job performed by a designated agent (usually an employee) and outsourcing it to an undefined, generally large group of people in the form of an open call. Other studies consider crowdsourcing as part of the broader paradigm of collective intelligence and review the similarities, overlapping, and gaps between human computation, crowdsourcing, social computing, and data mining (Malone, Laubacher, and Dellarocas, 2009; Quinn and Bederson, 2011).

The three key elements intersecting web-based crowdsourcing are the crowd, the outsourcing model, and advanced internet technologies (Saxton, Oh, and Kishore, 2013). Accordingly, crowdsourcing is a sourcing model in which organizations use predominantly advanced internet technologies to harness a virtual crowd's efforts to perform specific organizational tasks (ibid). Chamales (2013) also refers to 'crowdsourcing technology' as an enabler to bring together individuals' distributed workforce.

Using geographic information systems to map communities in disasters, groups like Ushahidi and the Crisismappers have used cartographic technology via computer links and cell phones combined with the data those communities produce over social media (White and Palen, 2015; Hughes and Tapia, 2015). The beneficiaries of these efforts are also not merely consumers. They are a part of the sensemaking effort that synthesizes the context of the data into usable formats, e.g., a micro-map or person finder app. In crisis management, the use of social technologies, especially crowdsourcing, arguably can redistribute decision-making power from organizations such as NGOs to organizations like the V&TCs (Barnet, 2013).

Figure 3 illustrates the crowd's roles as both the source of big data and the tasker that synthesizes meaning or 'makes sense of' the data for broader use. Crowdsourcing technologies come with dedicated modules to manage digital or field volunteers (or both), often including local communities experiencing a disaster and involving the global public.

Figure 3: Crowdsourcing roles based on users' involvement and data processing



Poblet et al., 2014

In figure 3, we can distinguish the crowd's role based on the type of data level of participation. The crowd's size and composition can also help determine whether the crowdsourcing effort is unbounded (anyone can participate) or bounded to a small number of trusted actors (Meier, 2011). Prpic and colleagues (2013) have distinguished different types of crowd capital generation based on organizations' crowd capabilities as they engage with dispersed knowledge of individuals. There are four types of crowdsourcing roles based on (1) the type of data processed (raw, semi-structured, and unstructured), (2) participants' level of involvement, and (3) skills required to fulfill the task (basic or specialized).

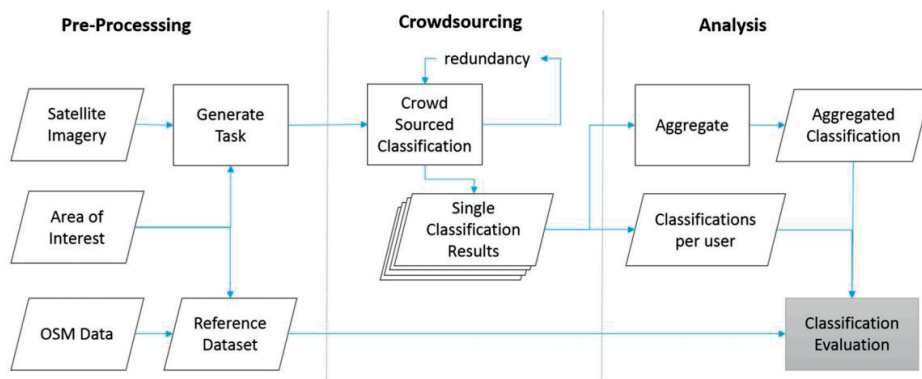
Poblet and colleagues (2014) also created a taxonomy of crowdsourcing tools that classify the different platforms and mobile apps upon four characteristics: i) the phase of the crisis management cycle where it is better applied, ii) the availability of the tool and its source code, iii) the central functionalities, and the iv) crowdsourcing role types. They also summarized the use of crowdsourcing in disasters in the following roles:

- Crowd as a sensor: the tool enables the collection of data from multiple devices, including mobile handsets, and each of these devices provides some local information that can be either automatically generated (run by sensors in the background) or human-generated.

- Crowd as a social computer: the tool provides some applications or human-computer interfaces enabling the users to collect data from social media and engage in social conversation if needed.
- Crowd as a reporter: the tools provide a platform where people can offer first-hand information on events as they are unfolding and allow the identification of a reporter versus an occasional user to preserve trustworthiness.
- Crowd as a micro-tasker: the tool provides applications or human-computer interfaces to execute specific processing tasks by users.

These tasks differ in that they exploit some specific knowledge and require significant training to accomplish them. Crisis mapping via crowdsourcing has been of interest to organizations of crisis management. For years, spatial data growth was limited to activities carried out by specialist organizations (Goodchild and Glennon, 2010). However, following the emergence of Web 2.0 and the improvement of mobile devices to provide data related to their location, people began to be more involved in crowdsourcing, and in many cases, they collected more detailed information than was provided by official institutions (De Longueville et al., 2010; Gill and Bunker, 2012). Figure 4 shows how crowdsourcing is processed, required three phases in which the type of data is specified, the process of classifying relevant information from noise, and its analysis.

Figure 4: Crowdsourcing Process



Source Herfort et al., 2015

The process of classifying crowdsourced [big] data does not show the complexity of adding these classifications into an information management flow. However, research has shown that operationalizing crowdsourcing raises concerns about whether the data collected by 'the crowd' is credible, reliable, and of good quality for use in disaster sensemaking (Elwood, 2008; Adam, Shafiq, and Staffin, 2012). Therefore, crowdsourcing and its byproducts, e.g., crisis mapping, data aggregation,

can be regarded as lacking credibility and reliability. Nonexperts produce it in a context that differs significantly from “structured institution-initiated and expert-driven contexts” (Elwood, 2008, p. 16). This information’s sheer abundance has also highlighted a problem about its structuring, storage, and dissemination (Bishr and Janowicz, 2010).

1.3.3. The Emergence of Digital Humanitarians

Digital humanitarians have been called an “informal response community” which contributes to crisis management by “monitoring and responding to social media, creating and updating digital maps, and helping to coordinate relief and recovery” (Starbid, 2013, p. 24; Hughes and Tapia, 2015, p. 680). Since 2012, these digital humanitarians have become known as Virtual & Technical Communities (V&TCs) and have responded to numerous crises worldwide. One of the most profound changes in humanitarian aid has been the ability to involve populations themselves in identifying critical information via digital communication channels. For instance, digital humanitarianism has used open data, open-source software, and geographic information, known as ‘crisis mapping’ (Harvard Humanitarian Initiative, 2011).

Digital volunteers coalesced into formalizing new actors such as the *Humanitarian OpenStreetMap Team* (HOT), *Ushahidi Inc*, *Humanity Road*, and the *StandbyTaskForce* (Soden and Palen, 2014). For instance, crisis mapping communities combined considerable crowdsourced volunteer support with online crisis mapping techniques composed of thousands of digital volunteer groups such as the *International Crisis Mappers Community*, the *Camp Roberts Experiments*, or the *World Bank Crisis Camps* (Starbird and Palen, 2011). These emerged onto the scene with unprecedented data-gathering methods (e.g., *Digital Globe*, *GeoEye*). Crisis mapping became a staple of augmenting decision support as much of the usual spatial data for disaster-affected areas were not detailed enough to guide response efforts (Soden and Palen, 2014).

As Burns (2014) observed, the digital humanitarians involve “different modes of production, processing, curation, and representation of people, places, and knowledge; that is most often, spatially and socially-distanced ... through digital technologies” (p. 53). In this view, the promise of digital technologies, or ICTs and methods, including crowdsourcing, transforms power relations in crisis management to ‘leaner’ and ‘horizontal’ networks (Duffield, 2013). The traditional systems of information management of organizations in crisis management move information up and down hierarchies. However, with digital humanitarians, these systems face a significant change whereby information management flows are flattened into horizontal streams (Vidolov, 2014).

Digital humanitarians have often been called an “informal response community,” which includes international online volunteers who contribute to emergency response by “monitoring and responding to social media, creating and updating digital maps, and helping to coordinate relief and recovery” (Hughes and Tapia 2015, p. 680). While volunteering in disasters is not new, the ICTs have opened new ways for remote digital volunteering, where the desire to help is combined with a personal interest in a particular area or crisis or motivation to learn new skills in technology and crisis response (Castillo, 2016, p. 104). Digital humanitarians are external to the “formal” relief effort (aid organizations or official emergency response structures). However, they are active in various situations: from disasters and wars to elections and revolutions (Starbird, 2011; Crowley, 2013; Meier, 2015; Dave, 2017).

One of the significant contributions of digital humanitarians is online crisis mapping—geotagging “crowd-generated data such as social media feeds and photographs, with geographic data ... in support of crisis management” (Shanley et al., 2013, p. 866). They act as an aggregating and processing filter to traditional user-generated content—which is no easy task as only a tiny proportion of this content is relevant or contains enough information to be mapped and can honestly inform relief efforts. As broadly acknowledged by policymakers and scholarly contributions, these developments are changing the possibilities for prevention, response, and resource mobilization in disasters (Hughes & Palen, 2009).

These digital humanitarians have since become known as the Virtual & Technical Communities (V&TCs) and have responded to numerous crises worldwide. We will expand on these better in Chapter Three, suffice it to say here that their reception into the sector of humanitarian aid has not been universally flattering. Concerns about their organizational style, data quality and accuracy, and the utility of their information products have raised barriers to collaboration and partnership (Burns, 2014). For example, social media data is readily fabricated by individuals and malevolent state actors who wish to subvert humanitarian assistance or direct it to their own needs. The humanitarian aid organizations have lacked confidence in this data’s verifiability and have often struggled to connect with potentially thousands of digital humanitarians (Tapia et al., 2011). Ultimately, these concerns have resulted in a significant disconnect between the vision of a networked age for humanitarianism and reality.

In the *Coming Global Boom and Megatrends 2000*, Morris (1990) and Naisbitt and Aburdene (1990) predicted that organizations would undergo changes that make them more responsible for employing external alliances, resources, and outsourcing in all areas of human involvement. Gray and Wood (1991) also predicted that middle management in industries would grow thin and serve primarily as a technical apparatus—developing policy, procedures, and applications for other employees and

specialists. The predictions were significant because they have occurred within the decision-support landscapes of crisis management in the humanitarian aid sector. However, more on that will follow in Chapter Three. Suffice it to say that who can contribute in crisis management now includes entrepreneurial operations versus traditional bureaucracies thanks to social media's affordances and a Web 2.0 culture (). The shift away from a traditional culture of information controlled by a handful of actors is seemingly accelerated by the rising demand for ICTs that offer novel methods of sensemaking and transparency (Chua and Westlund, 2019).

1.4. Collaborative Governance in Crisis Management

One of the central issues in the literature following the developments in humanitarian aid concerns the reliability of collaborative relationships between HROs and the V&TCs (Meier, 2012; Crowley, 2013; Van Dooren and Van de Walle, 2016). Collaboration is the foundation to strengthen crisis management, and it is the “mutually beneficial and well-defined relationship entered into by two or more organizations to achieve common goals” (Mattessich and Monsey, 1992). This includes a commitment to a standard structure that ensures accountability for success. Towards this objective, the digitalization of crisis managements includes a whole new diaspora of actors currently considered ‘informal’ or belonging outside the spectrum of stakeholders in the humanitarian aid sector.

Adopting ICTs and leveraging the digital crowd's power has influenced collaboration to pursue better decision-making (Yang and Maxwell, 2011). In other words, ICTs have the potential to revolutionize crisis management by including whole new actors with a completely different vision for addressing complex societal problems. The best way to study whether this notion holds is through the lens of Collaborative Governance.

Over the past two decades, new collaborative approaches to governing and managing crises have developed in various fields, including urban and regional planning, public administration, and law (Ansell and Gash, 2008). For instance, public administration has undergone changes from ‘old-style’ bureaucracy to that of the networked society with the acceleration of public participation via the internet (Morse and Stephens, 2012). Likewise, the same can apply to crisis management's potential revolutionization through repeated collaboration instances between agencies and their beneficiaries.

Collaborative Governance is increasingly viewed as a proactive policy instrument, one in which the strategy of collaboration can be deployed on a larger scale and extended from one local context to another (Ansell and Gash, 2018). In recent studies, Collaborative Governance focussed on several research streams. These include studies on the evolution of social brokerage among bureaucrats (Grønnegård,

2018), the development of comingling networks (Silvia, 2018), and most recently, changing public administration during the global COVID-19 pandemic (Ansell, Sørensen and Torfing, J. (2020).

Some studies have highlighted the revolutionary potential of the digital humanitarians' work, but non-have attempted to view them through the lens of Collaborative Governance (Muhren and Van de Walle 2010; Starbird and Palen, 2011; Meier, 2015). Only a handful have come close to explaining the relationship between power, technology, and agency within the landscape of humanitarian aid (Burns, 2014; Verity, 2013, 2015). These studies have focused on the technical aspects of bringing big data, mainly via social media, into the sensemaking chains of HROs, but none have looked into the dynamics of collaboration between the actors that facilitate this activity nor how that facilitation changes their management styles (Hughes and Palen, 2009; Goodchild and Glennon, 2010; Van de Walle, Turoff, and Hiltz, 2014; Hughes and Tapia, 2015; Van de Walle and Comes; 2015). Several of these studies focused on the collaboration between HROs and V&TCs in the local context but very few that capture the large-scale developments and efforts to integrate (Harvard Humanitarian Initiative, 2011; Whipkey and Verity, 2015ab; Van de Walle, Bruggemans and Comes, 2016; Dave, 2017; Hunt and Sprecht, 2019). These studies highlight different challenges and difficulties, including:

- The heterogeneity of organizations in humanitarian aid, especially HROs (Tapia et al., 2011; Ngamassi, Maitland and Tapia, 2014).
- The challenges of integrating the V&TCs to the humanitarian aid sector (Van Gorp, 2014).
- The lack of trust between HROs and V&TCs (Vidolov, 2014; Hughes and Tapia, 2015).
- Narrow views of sensemaking among actors in humanitarian information management (Muhren and Van de Walle, 2010; Van de Walle and Dugdale, 2012).
- The lack of technical infrastructure and human resources among HROs to add big data to their sensemaking toolbox(es) (Vieweg, Castillo, Imran, 2014; Van Gorp, Pogrebnyakov and Maldonado, 2015; (Van de Walle and Comes, 2015; Van de Walle, Bruggemans and Comes, 2016).
- The V&TC's lack of familiarity with the traditional information management processes of the HROs (Waldman, Verity, and Shadrock, 2013; Altay and Labonte, 2014; Verity, 2015).

These studies help understand where V&TCs fit within the humanitarian aid sector and what steps HROs have taken to incorporate big data into their traditional information management flows. However, the findings are fragmented and do not clarify how HROs and V&TCs have collaborated to complement information

management in humanitarian aid. That is the reason why the V&TCs have been complimentary to the milieu of the humanitarian aid sector, as their ability to crowdsource social media, extract meaning from big data and shape it to produce informational products affords them better attention. Some of the issues pointed out can be better understood by taking a closer look at the network level of interactions between HROs and V&TCs. In this manuscript, the interplay of collaboration between their networks can help us understand the extent of big data's incorporation into humanitarian aid in the technical methods of collection and analysis and collaborations to share those activities across different organizations.

Although bureaucracies remain, public agencies recognize that more can be achieved with decentralized management approaches to sensemaking via ICTs such as crowdsourcing (Mayer and Kenter, 2015). This study is timely, as ICTs have blurred the lines between the citizens, the private sector, and their governments, and it will continue to change the landscape of power and agency (Getha-Taylor and Morse, 2013; Ansell and Gash, 2018). Therefore, the manuscript explores how HROs and V&TCs have collaborated to bring capacities that make sense out of big data to the field of humanitarian aid. To do this, we draw on an analytical framework known as the Collaborative Governance Model or 'CGM' that offers a structure to understand how actors develop desirable policy outcomes to complex societal problems. This model also enables us to explore the phenomenon that has not been attempted and may also be appropriate for looking into other diverse actors' interactions facing shared and complex issues.

1.5. Summary

The chapter introduced the phenomenon, which is a relatively complex topic within the literature. In short, the problem is that HROs in the field of humanitarian aid have struggled to adapt the potential uses of big data into their informational capabilities. This has been a problem since it was first introduced to them in the Haiti response in 2010. Instead, the work of processing and making sense of big data has been left to the V&TCs or digital humanitarians, made up of networks and quasi-organizations that are not generally humanitarian professionals. However, they have the technical know-how to apply big data to inform how the HROs can address disaster-affected communities' needs. Therefore, this manuscript takes the position that incorporating big data into formal information management flows is not merely about how to do it technically but also about incorporating the V&TCs into the humanitarian aid sector. The skills needed to carry out such complex tasks require significant technical and human resources. The next chapter will explain in detail the conceptual framework: The Collaborative Governance Model or CGM and justify its use in line with the study's focus: the networks of the HROs and V&TCs, and their interplay.

2

THEORETICAL FRAMEWORK

This chapter will form the conceptual framework that informs on the collaborations between Humanitarian Response Organizations (HROs) and Virtual and Technical Communities (V&TCs) concerning how they collaborate in disasters (these will be elaborated in Chapter Three). This chapter details the conceptual framework given by Ansell and Gash's (2008) Collaborative Governance Model or 'CGM,' which will sketch the Collaborative Process of two different but complementary networks. The CGM variables give a closer look into the nuances involved in building and sustaining collaborations geared towards resolving complex problems. These are exemplified in three core contingencies: *time*, *trust*, and *interdependence*.

2.1. COLLABORATIVE GOVERNANCE: LITERATURE AND EXAMPLES

Collaborative Governance is a traditional notion that emerged from a body of knowledge that suggests increasingly networked forms of collaboration are needed to address complex societal problems (Gray, 1989; 2000; Huxham, 1996; Thomson and Perry, 2006; Thomson, Perry, and Miller, 2007). Future Governance should employ inclusive forums among social actors and assume that their power to shape policy may take shape in new ways due to the empowerment of new types of actors via ICTs (e.g., specialized knowledge or technologies). Gray (1998) views the stakeholder or actor qualification as a party that has a stake in a given issue and "who see different aspects of a problem and can constructively explore ... solutions that go beyond their limits" (p.5).

The literature on Collaborative Governance challenges naturalized ideas of fixed hierarchical order. Although Susskind and Cruikshank (1987) and Gray (1989) have suggested, Collaborative Governance focuses on single-case studies that are sector-specific and difficult to reproduce. For example, Innes and Booher (1999) provide foundational accounts of collaborative planning, as Freeman (1997) does for regulation and administrative law and as Wondolleck and Yaffee (2000) do so for natural resources management. All of these have different rules among their actors, as well as a hierarchy to their interactions.

Also, collaborative networks transgress spatial scales even if they are fixed to a specific feature like geography. For instance, collaborative networks in cities operate globally by transforming their politics and economies by rescaling the state and market (Bulkeley, 2005; Leitner and Grechenig, 2008). Collaborative Governance can involve governments, communities, and private sectors communicating with each other and working together to achieve more than any one sector could achieve on its own. Therefore, Collaborative Governance is about steering and coordinating an institutionalized rule system that maximizes a shared goal (Torfing et al., 2012).

Collaborative Governance often appears in public administration and social science literature (Gray, 1989; Thomson & Perry, 2007; Emerson, Nabatchi, & Balogh, 2012), yet its definition is inconsistent. Ansell and Gash's (2008) define Collaborative Governance as "a governing arrangement where one or more public agencies engage non-state actors in a collective decision-making process that is formal, consensus-oriented, and deliberative toward making public policy" (p. 549). Ansell and Gash's (2008) Collaborative Governance Model is not contingent on this definition; however, they allow other researchers to customize the model's parameters to extend the use cases that can be applied, e.g., the definitions of terms and the context setting.

Since our research does not deal with an activity's management, we will substitute the term 'stakeholder' for the term 'actor' to refer to the organizations and entities that our study participants represent. We also adopt Rochlin and colleagues' (2008) description of Collaborative Governance as "...arrangements that involve a deliberative multi-stakeholder collaboration in establishing rules of behavior in the development of a broader community of actors" (p. 382). Collaborative Governance is used to address complex social, environmental, and urban planning issues, including crisis management and urban growth (Twyford and Twyford, 2012). As Rochlin and colleagues (2008) indicated, the collaborations between multiple actors are deliberate and structured by rules that can be altered and changed over time (p. 34). The next sub-sections offer a few examples of Collaborative Governance having been applied in various contexts.

2.1.1. Water and Food Security

The California 'CALFED' Water Program is one of the largest and most complex systems globally, and consequently, one of the most innovative. CALFED is an ambitious experiment in collaborative policy and adaptive management. Water has long been a critical resource in California (Booher, 2004). The Bay-Delta region comprises the San Francisco Bay area and Sacramento–San Joaquin Valley. The Bay-Delta is a fragile, valued ecosystem and the water 'hub' of California through which 22 million people, two-thirds of the state's population, receive their drinking water (Kallis, Kiparsky & Norgaard, 2009).

Interventions to transform it have pitted north against south, locals, and environmentalists against cities and farmers (Hundley, 2001). Over 25 federal and state agencies and representatives of more than 30 major civic groups and local agencies collaborated in an integrated restoration and management program. Collaborative Governance was theoretically applied to foster inter-agency integration and participation that is now the existing paradigm for managing environmental problems (Folke et al., 2005; Lemos and Agrawal, 2006). These ideas also underpin

major policy initiatives elsewhere, such as the E.U. Water Framework Directive (Kallis and Butler, 2001).

2.1.2. Border Security and Safety

Large projects and initiatives require partnerships between their governmental agencies. For example, the growing number of official and non-official crossings of the US-Mexico border has required input from all U.S. and Mexican governments to settle land management, legal and social affairs (Emerson and Nabatchi, 2015). For example, the U.S. Border Patrol and Forest Service successfully enacted the '2006 memorandum of understanding': creating an inter-agency forum to increase field coordination and constructing fences and other infrastructure (*ibid*).

In the European Union, similar trans-boundary issues have required innovative approaches that address land management and security's broader implications. For instance, migration issues have become an essential topic of contemporary security politics in Europe by which Collaborative Governance is being applied to address (Baird, 2017; Walters, 2017). For instance, the creation of FRONTEX and digitizing surveillance features joint operations coordinated by various law enforcement and military branches among the E.U. member states (Lutterbeck, 2006; Carrera, 2007; Baldaccini, 2010). From a theoretical point of view, Collaborative Governance can help further develop the 'sociological' approach to securitization issues concerning border security and safety in Europe.

2.1.3. Public/Private Partnerships for Crisis Management

Agranoff and McGuire's (1998) study of city government showed that most cities routinely become involved in multiple collaboration networks. The presumption is that local governments engage in multiple arrangements in pursuit of flexibility to complex issues. In 1997, the South Dakota Federal-State Rural Development Council convened a group of officials from the federal government, state government, private sector, and native tribes to respond to the devastating impact of the 1996-1997 winter blizzards and spring floods. The network was able to move federal assistance through the state and local governments in ways that had not been done before. State officials brokered remediation programs through non-profit and state-wide associations that offered surprisingly quick food aid and temporary shelter deployments (*ibid*). In this way, the collaborators enhanced flexibility and adaptation through ongoing interaction and adjusting to standard operating routines by engaging in innovative management styles.

Over the past two decades, new collaborative approaches to governing and managing crises have developed in various fields, including urban and regional planning, public administration, and law (Ansell & Gash, 2008; Morse and Stephens, 2012). Public administration has changed from 'old-style,' top-down bureaucracy to

a flatter-networked society (Jensen, 2019). Although bureaucracies remain, public administrators have begun to recognize that more can be achieved with more decentralized management approaches to complex public problems. This comes when newer ICTs have blurred the lines between the citizens, the private sector, and the government.

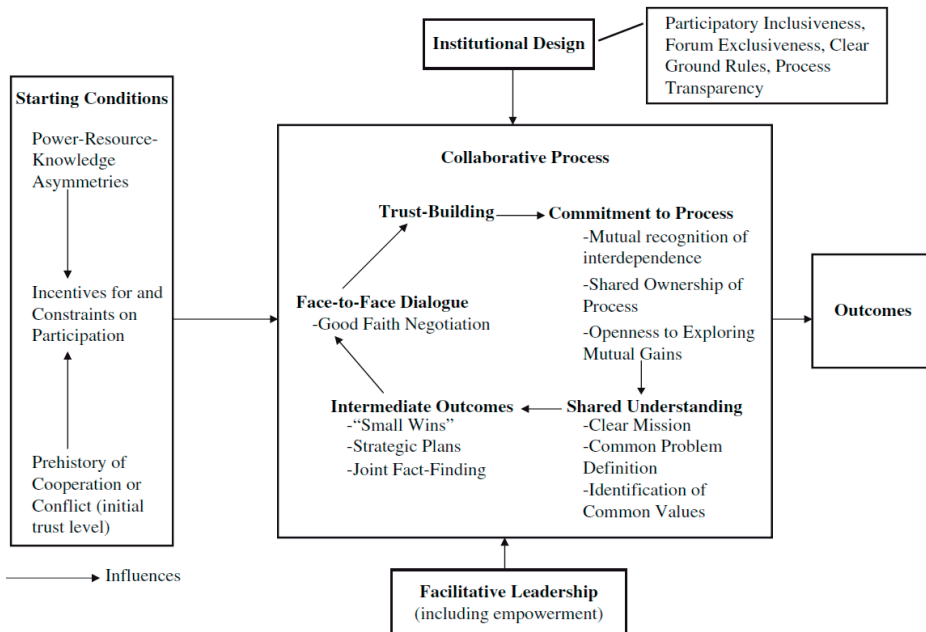
2.2. THE COLLABORATIVE GOVERNANCE MODEL

Ansell and Gash's original intent for the Collaborative Governance Model was to study large organizations and public agencies' consensus-based decision-making. Governance is a broader concept than government and includes the community sector's roles and the private sector in managing and planning countries, regions, and cities (Phares, 2004). Collaborative Governance covers both the informal and formal relationships in problem-solving and decision-making, which concern government policy processes by facilitating collaboration between the public, private, and community sectors.

Collaborative Governance requires three things, namely: support, leadership, and a forum. The support is composed of relevant actors that identify the policy problem to be fixed. The leadership comprises representatives of those actors that gather them into a forum ("What is Collaborative Governance?", 2015). The forum is essentially a collaborative network, "a system that is meant to accomplish more alignment among community needs, strategies of service agencies, priority outcomes, and resource allocation. It is also meant to accomplish building social capital; integration of human service delivery; and interconnected strategies for relationship building, learning processes, and measurement and modeling among the participants" (Bradley, 2012, p. 4-8). The manuscript will unpack these complexities in the HROs and V&TCs using Ansell and Gash's (2008) Collaborative Governance Model (CGM).

The Collaborative Governance Model (CGM) is an input-output model designed to study the processual and management reflections on collaboration and how it is governed. Ansell and Gash (2008) developed the model out of "the failures of downstream implementation and the high cost and politicization of regulation" (p. 5). As stated in the previous chapter, the goal of the HROs' and V&TCs' was to develop a standard structure for crisis management's digitalization, including a new diaspora of actors. Doing so involved adopting ICTs and integrating new forms of sensemaking that utilize big data to add insight for improved decision-making. However, this also required "new rules, new systems, and new expectations to tide over the early period of an emergency" (Kendra and Wachtendorf, 2003, p. 53). Therefore, CGM provided a suitable theoretical approach that dives into the complexities of collaboration and their exigent challenges in developing a shared policy outcome. Figure 5 presents the CGM in its original form below.

Figure 5: Collaborative Governance Model



Source: Ansell & Gash, 2008

Each section of the CGM can be disaggregated into more fine-grained explanations. For instance, *Starting Conditions*, *Institutional Design*, and *Facilitative Leadership* variables are critical to understanding the *Collaborative Process*. They provide context to the process of the actor's engagement with each other. For example, the *Starting Conditions* set the necessary level of trust, conflict, and social capital that critically shape the context of collaboration. Institutional design sets the basic ground rules under which collaboration occurs, while leadership provides essential mediation and facilitation between the actors who perform the *Collaborative Process*. Ansell and Gash (2008) have explored these conditions, stating “the ultimate goal is to develop a contingency approach to collaboration that can highlight conditions under which Collaborative Governance serves as an approach to policymaking and public management” (p.8).

Gibson, Ostrom, and Ahn (2000) describe the approach to public management and policy as occurring in spatial levels such as a ‘region along a measurement dimension,’ e.g., the micro-macro-levels of an organization are levels in which policy is actively formed (p. 219). In simpler terms, the three core contingencies necessary for Collaborative Governance: time, trust, and interdependence, can enable large-scale changes through lower levels of networked interaction. The theory being that significant policy changes or institutional reform can occur through innovative work

practices derived from collaboration between two different but complementary networks (Thomas and Kopczak, 2005; Van Wassenhove, 2006).

2.3. INSTITUTIONAL DESIGN

We begin our understanding of the CGM with the *Institutional Design* of the Collaborative Process shaped by the actors' unique personalities. *Institutional Design* refers to the fundamental protocols and ground rules for collaboration, critical for the Collaborative Process's procedural legitimacy. These are formed by the actors' organizational scale, values, and capacity to incentivize negotiation through balanced management. For instance, access to the Collaborative Process is perhaps the most fundamental design issue as stronger actors can use their position to oust smaller actors or force others to conform to their point of view (Ansell and Gash, 2008; Emerson, Nabatchi and Balogh, 2012).

Chrislip and Larson (1994, cited in Ansell & Gash, p.14) wrote, "the first condition of successful collaboration is that it must be broadly inclusive of all actors who are affected by or care about the issue." This includes potentially troublesome actors; as Gray (1989) observed in his work, disputes over the legitimacy of the Collaborative Process includes specific actors, but "...successful collaboration depends on including a broad enough spectrum of actors to mirror the problem" (p. 68). Excluding certain actors ultimately threatened the legitimacy of the process (Gray, 1989, p. 155).

Broad participation must not just simply be tolerated but actively sought. Reilly (2001) found that successful collaboratives pay considerable attention to getting actors to participate and that critical actors' exclusion is a crucial reason for failure. In his study of the U.S. electric industry, Koch (2005) found that Collaborative Governance required the inclusion of small firms and public power organizations that had traditionally been excluded from conventional models of governance. Broad-based inclusion is not merely a reflection of the open and cooperative spirit of Collaborative Governance. It is at the heart of a legitimation process, and weak or non-inclusive representation threatens to undermine Collaborative Outcomes' legitimacy (Beierle and Konisky 2001; Geoghegan and Renard, 2002; Smith, 1998).

Proactive strategies of mobilizing less represented actors are necessary for the Collaborative Process's *Institutional Design* (Weech-Maldonado and Merrill, 2000). Actors may not have an incentive to participate, mainly if they see alternative venues for realizing their agenda. The literature suggests that inclusiveness is linked to the collaborative forum's exclusiveness (Schuckman, 2001; Tett, Crowther, and O'Hara, 2003). Meaning, when the collaborative forum is "the only game in town,"

it is easier to motivate actors to participate; conversely, they may be compelled to seek alternative venues when excluded (Kraft and Johnson, 1999, p. 136).

The existence of alternative forums can also be a negative precondition for effective collaboration. As Reilly (2001) puts it, “When alternative avenues exist for resolution, a collaborative method of resolution is not optimal” (p. 71). Fung and Wright (2001) note that “participants will be much more likely to engage in earnest deliberation when alternatives to it—such as strategic domination or exit from the process altogether—are made less attractive by roughly balanced power” (p. 24). It is also suggested that institutional design is established with ground rules and process transparency being an essential design feature, and both can be understood in terms of procedural legitimacy (Geoghegan and Renard 2002; Murdock, Wiessner and Sexton, 2005).

2.4. STARTING CONDITIONS

Ansell and Gash (2008) suggest that collaboration can either facilitate or discourage cooperation among actors depending on three broad variables: (1) imbalances between the resources or power of different actors, (2) the incentive for participants to collaborate, and (3) the history of conflict or cooperation among them. The literature on ‘starting conditions’ assumes that the participants start opposing positions at the beginning of a Collaborative Process. However, this need not be the case for every application of the CGM. The literature further indicates that the prehistory of antagonism or cooperation between actors will hinder or facilitate collaboration (Andranovich, 1995; Gray, 1989; Margerum, 2002). Such prehistory occurs in resource management contexts where the deadlock itself imposes a severe cost to actors involved in existential territorial disputes.

The starting conditions for the Collaborative Process are shaped by four sub-variables inherent in the preconditions of the actors’ engagement: *power/knowledge asymmetries, incentives/deterrents to collaboration, pressures and influences, the prehistory of cooperation or conflict*. Each of these will be reflected in the following sub-sections.

2.4.1. Power/Knowledge Asymmetries

Power/knowledge asymmetries between actors are commonly found in Collaborative Governance literature (Gray, 1989; Susskind & Cruikshank 1987; Tett, Crowther and O’Hara, 2003). It is common for cases to have actors with very different backgrounds and political dimensions affecting their ability to collaborate. For example, Bradford (1998) observed the government of Ontario’s attempt at changing occupational health and safety policy through grassroots collaboration. However, this was thwarted by the privileged status of private firms when senior

officials shaped policy through informal channels and not through inclusive frameworks. Such problems are inherent in two dimensions: an actor's power to affect policy to their desires and an actor's knowledge base for dealing with a particular problem. Additionally, some actors may not have the energy or liberty to engage in time-intensive Collaborative Processes (Wondolleck and Yaffee, 2003). Thus, the CGM use can be skewed in favor of more dominant actors at the beginning of the collaboration (Schuckman, 2001).

In cases where the start of collaboration is contested by actors with more significant resources or power, smaller or less privileged actors can still be quite effective in negotiating their presence within a collective framework (Rogers et al., 1993). For instance, some actors may not have the expertise to engage in discussions about highly technical problems, and in this case, no amount of power projection can substitute for the knowledge parity of actors that do (Merkhofer, Conway and Anderson, 1997; Day and Gunton, 2003; Lasker and Weiss, 2003). So, whether they agree with it or not, larger actors may find it necessary to collaborate with smaller counterparts if their technical understanding of a problem is lacking. Similarly, they may find it necessary to learn about the technical issues by engaging in collaboration even if the eventual goal is to build up their solutions to the problem (Murdock, Wiessner, and Sexton, 2005).

The literature points to a range of strategies that can be used to empower weaker or underrepresented groups (Gray, 1989; Warner, 1997; Schuckman, 2001; Lasker and Weiss, 2003). Trends toward collaboration arise from the growth of knowledge and institutional capacity, but power imbalances produce distrust and weak commitments that must be overcome (Powell, 1990). As knowledge becomes increasingly specialized and distributed, institutional infrastructures become more complex and interdependent, for which the demand for collaboration increases. Several other scholars have also traced Collaborative Governance to its origins in the broader notions of public administration and democracy and various management settings (Fung and Wright, 2001; Cooper, Bryer and Meek 2006; Bingham & O'Leary, 2008).

2.4.2. Incentives/Deterrents to Collaboration

Incentives and deterrents to collaborate depend in part upon stakeholder expectations about whether the Collaborative Processes will yield meaningful results (Ansell and Gash, 2008). Incentives increase as actors see a direct relationship between their participation and policy outcomes (Brown, 2002). However, they decline if actors perceive their input as merely advisory or largely ceremonial (Futrell, 2003). Although courts or legislatures may mandate collaborative approaches, actor participation is voluntary. Consequently, the incentives to enter a collaboration

will loom large as a factor in explaining whether Collaborative Governance can be successful.

Incentives to participate are low when actors can achieve their goals unilaterally or through alternative means. Even if actors tentatively decide to engage in the Collaborative Process, they may take their claims to an alternative venue if they become disgruntled with the process or its outcomes (Weber and Khademian, 1997). Incentives to participate in Collaborative Governance will also increase if actors perceive their goals to be dependent on cooperation from other actors (Logsdon, 1991). For example, the prevalence of Collaborative Governance in local resource management disputes is related to local groups' joint dependence on a shared resource (Heikkila and Gerlak, 2005). The implication of this is those antagonistic actors that are also highly dependent upon each other may move toward a successful Collaborative Process if the incentives for collaborating outweigh their ability to achieve their goals on their own (Wondolleck and Yaffee, 2003).

2.4.3. Pressures and Influences

There can be external and internal pressures that shape the starting conditions of Collaborative Governance. Ansell and Gash (2008) do not detail this, save for indicating that it is a part of the causal relationship between *power/knowledge asymmetries*, *incentives/deterrents* to collaboration, and *prehistory of cooperation or conflict*. Fung and Wright (2001) have stressed that pressures and influences outside the Collaborative Process must be thoroughly addressed to avoid the risk of manipulation or bad-faith dealings. Unless the Collaborative Process is deliberative, the actors may pit against coming to the negotiating table due to strategic thinking and insulated competitive pressures (Osborne, 1992). Moreover, inauthenticity perceptions can trigger negative judgments of the process and can be used as justification to withdraw from full participation or to doubt the validity of the Collaborative Process (Margerum, 2002; Tyler and Blader, 2000).

Internally, the actors can be affected by their mission-driven identities and institutional cultures. Tang and Mazmanian (2008) call this sociological institutionalism, which emphasizes how organizations are influenced by the social pressures generated from their organizational field (p. 38). DiMaggio and Powell (1983) also defined this as "a community of organizations that partakes in a common meaning system and whose participants interact more frequently and faithfully with one another than with actors outside the field" (p. 26). For instance, when comparing public sector agencies' performance, ineffectiveness and inefficiency are not inevitable characteristics of Collaborative Governance, but they are familiar precisely because of the pressures and influences they receive that results in their siloed institutional cultures (Tang and Mazmanian, 2008 p. 32). Such political and

distributional obstacles to designing collaborative arrangements must be overcome with those difficulties in mind from the beginning.

2.4.4. Prehistory of Cooperation or Conflict

Collaborative Governance often builds on a history of rancor that has institutionalized the social psychology of antagonism. As Ansell and Gash (2008) pointed out, “mediators are keenly aware of us versus them dynamics that are poisonous to a successful collaboration” (p. 11). Prehistory of conflict is likely to express itself in low levels of trust, which will produce low levels of commitment, manipulation strategies, and dishonest communications. In other words, prehistory of conflict creates a vicious circle of suspicion, distrust, and stereotyping.

On the other hand, a history of successful past cooperation can create social capital and high trust levels that produce a virtuous collaboration cycle. Conflict is not necessarily a barrier to collaboration, and in many cases, the actors begin their engagement as opposed to each other. Where conflict is high and trust is low, and actors have an incentive to participate. Collaborative Governance can successfully proceed by relying on a mediator or ‘broker’ (ibid). Suppose there is a prehistory of antagonism among the actors. In that case, Collaborative Governance is unlikely to succeed unless (a) there is a high degree of interdependence or (b) positive steps are taken to remediate the low levels of trust among them (ibid). Ultimately, new collaborations or collaborations that start with actors opposing one another require facilitative leadership that is willing and able to manage the Collaborative Process toward a productive result.

2.5. FACILITATIVE LEADERSHIP

Collaborations are not self-administering enterprises as organizations require a structure for deliberation and action (Wood and Gray, 1991; Fung and Wright, 2006). Rubin (2009) explains that a collaboration’s success depends on one or more collaborative leaders’ ability to build and maintain relationships. However, collaborations can also result from less traditional relationships, such as between large organizations and small civil society groups or networks. Although these are complex, they require less-traditional coordination systems such as a hierarchy because participants are autonomous or semiautonomous (Huxham, 1996; Vangen and Huxham, 2003). In this way, facilitative leadership offers a way to overcome the failures and high costs of addressing joint problems unilaterally.

Facilitative Leadership is a critical ingredient for bringing parties to the table and steering them through the Collaborative Process’s rough patches (Chrislip and Larson 1994; Day and Gunton, 2003; Vangen and Huxham, 2003). Collaborations are more likely to succeed if a strong organic leader commands the various actors’

respect and trust at the Collaborative Process's outset. Such leaders emerge from within the community of actors, and their availability is likely to be highly contingent upon local circumstances. This contingency implies that a lack of leadership may seriously constrain the possibility for effective collaboration.

Although unassisted negotiations are possible, facilitative leadership is essential for bringing actors together and getting them to engage each other in a collaborative spirit (Chrislip and Larson 1994; Reilly, 2001). Susskind and Cruikshank (1987) also suggest interventionist mediation to the extent that actors cannot collaborate without a facilitative leader. *Facilitative Leadership* is the least intrusive of the management prerogatives, and it ensures the integrity of the consensus-building process. Leadership is crucial for setting and maintaining clear ground rules, building trust, facilitating dialogue, and exploring mutual gains.

Chrislip and Larson (1994) describe the facilitative leader or 'facilitator' as a steward of the Collaborative Process, e.g., a diplomat or broker (p. 125). CGM requires a specific type of leader characterized by focusing on promoting and safeguarding the collaboration rather than on individual leaders taking decisive action. Lasker and Weiss (2003) argue that the facilitators must have the skills to (1) promote broad and active participation, (2) ensure broad-based influence and control, (3) facilitate productive group dynamics, and (4) extend the scope of the process (p. 31). Successful collaborations may also use multiple leaders, formally and informally, rather than relying on one individual (Bradford, 1998; Lasker and Weiss, 2003).

Finally, if actors cannot reach a consensus with mediation, the third party may craft a nonbinding arbitration. Vangen and Huxham (2003) argued that leaders must often intervene in a more directive way to shape the agenda to move collaboration forward. That requires facilitative leaders to traverse each actors' organizational landscapes with some ease and familiarity. Susskind & Cruikshank (1987) also stated that facilitative leadership is the least intrusive of the management prerogatives where specific agents or intermediaries' bargain on behalf of two or more interests. Huxham & Vangen (2005) also argue that in order to move collaboration forward, leaders must intervene in a more direct way to shape the agenda.

Additionally, the activity of *boundary spanning* and *social brokerage* is added herein. It gives us a deeper understanding of facilitative leadership's behavior and its importance in shaping collaboration efficacy. Collaborative networks seek to bring groups together to effectively work toward a common goal in the best way possible (Long, Cunningham, and Braithwaite, 2013). Social brokers can support the controlled transfer of specialized knowledge between groups and increase cooperation by liaising with people from both sides of their respective gaps.

Social brokers also improve efficiency by introducing ideas from one isolated setting to another (ibid). *Facilitative Leaders* boundary span across the actors' respective networks, which regard the social structure or organization's relationships. They then engage in *Social brokerage*, a process in which the *Facilitative Leader* brokers incentives or acts as intermediaries between individuals or groups who do not directly access each other. These activities involve crossing between their cultures and institutional barriers to mediate the *Collaborative Process* (Friedman, 2001; Gray, 2008). Brokers are instrumental as facilitative leaders because the *Collaborative Process* usually fails (Borgatti, 2006). Ryan (1987) identified that the facilitator ought to be a leader concerned with the collaboration outcome and remain above the fray of disagreements among the participants (Ansell & Gash, 2008). Therefore, the CGM calls attention to how feedback from earlier collaborations shapes new interactions' structuration with a credible intermediary's supervision.

Social brokerage is the notion that an intermediary can incentivize actors to engage in negotiations through social networking and social capital to achieve a sense of legitimacy in the collaborative forum (DiMaggio and Powell, 1983; Ulibarri and Scott, 2017; Sørensen et al., 2020). The use of this term is intended to apply to the membership of the collaborative actors, whereby it is assumed that a strong interconnection between their networks exists, or when it does not, then the impetus falls to the facilitator's ability to leverage the actors into mutual compromises (Ansell and Gash, 2008).

Boundary spanning involves facilitating interactions between collaborative actors and managing them along the process. For instance, the healthcare sector is rich in isolated silos of professional 'tribes' connected through administrative liaisons (Long, Cunningham, and Braidwaithe, 2013). Bednarek and colleagues (2018) also characterized *boundary spanning* as an activity where "individuals are linked by patterned communication flows and created by the sharing of information in their interpersonal networks.

Vangen and Huxham (2003) emphasized that effective *Facilitative Leadership* is likely to be time, resource, and skill intensive but essential for empowering and representing weaker actors. However, it cannot be done meaningfully any other way than to have someone manage the *Collaborative Process* as a broker of two [or more] participating actors. Ozawa (1993, 2019), for example, describes what he calls "transformative" techniques in which mediation procedures help to bring about a "balance of power" among actors (p. 3). The requisite leadership qualities may depend on the context of the environment. When incentives to participate are weak or when power is too disproportionate, then the facilitative leader must often intervene to help keep actors at the table or empower weaker actors. The facilitative leader might be a professional mediator or diplomat who knows how to develop

trust among the actors and remain above the fray by maintaining the Collaborative Process's procedural integrity.

2.6. COLLABORATIVE PROCESS

Collaboration depends on achieving a virtuous cycle between communication, trust, commitment, understanding, and outcomes (Huxham, 1996). Therefore, the *Collaborative Process* is a simplification of a much more complex ecosystem of arrangements. Research on the complexity of collaborative ecosystems could fill an entire work volume, but we will not delve exhaustively into mapping that complexity. Instead, this manuscript calls attention to how power, knowledge, and leadership impact the *Collaborative Process*' sustainability concerning institutional and social factors with the *Collaborative Process*, e.g., institutional structure of the actors, external/internal pressures or influences, and power knowledge asymmetries et cetera.

Susskind and Cruikshank (1987) describe the *Collaborative Process* as having a pre-negotiation phase, a negotiation phase, and an implementation phase. Gray (1989) also defines a three-step *Collaborative Process*: (1) problem setting, (2) direction setting, and (3) implementation. There are also three steps to facilitating collaboration, according to Ansell and Gash (2008), which include (1) preparation, (2) policy development, and (3) decision making, with each step having several of its stages. This is especially true in disasters as situations are often fluid, and information travels quickly with changing priorities. In this way, collaboration depends on achieving a virtuous cycle between communication, trust, commitment, understanding, and outcomes (Rasche, Waddock & McIntosh, 2013).

The *Collaborative Process* comprises five essential variables, and each is a distinct element or process that is critical to the overall collaborative environment. These are *Face-to-Face Dialogue*, *Trust-Building*, *Commitment to the Collaborative Process*, *Shared Understanding*, and *Intermediate Outcomes*. These will be further explained in the following sub-sections. Furthermore, some of these, e.g., commitment to the process, shared understanding, and intermediate outcomes, have their deconstructions that will also be explained in the following sub-sections.

2.6.1. Face-to-Face Dialogue

According to Ansell and Gash (2008) and Emerson, Nabatchi and Balogh, (2012), typical Collaborative Governance occurs through face-to-face interactions and some stated commitment by the collaborating parties. Traditionally, *Face-to-Face Dialogue* has been at the core of the process of breaking down stereotypes and other barriers to communication that prevent the exploration of *mutual gains* (Bentrup, 2001). It is also considered to be at the heart of a process of *building trust*, *mutual respect*,

shared understanding, and commitments (Lasker and Weiss, 2003; Tompkins and Adger, 2004; Warner, 2006).

We accept that *Face-to-Face Dialogue* is not entirely predicated for collaborations to be successful. For example, it is possible to overcome stereotypes or status differences through facilitators or indirect communication (Burt, 2001; Ferrin, Dirks, & Shah, 2006). Face-to-face dialogue is especially problematic in our case as the case participants mostly interacted virtually and often at the request of a facilitator. Therefore, the face-to-face dialogue will not feature prominently in the analysis, but we will discuss the effects of its missing from the *Collaborative Process* in our study.

2.6.2. Trust Building

Ansell and Gash (2008) stated that collaboration is not merely about negotiation but also about securing its sustainability through *Trust Building* (p. 16). We understand trust as a set of practices for reducing risk and uncertainty (Möllering, 2001) as trust is central to developing a stable social order (Luhmann, 2000), the practices involved in our case deal with the reordering and stabilizing of networks to ensure maximum performance between the actors. According to Lyon (2006), trust either stems from the institutional context or as an institutionalized organization's interpersonal product. In both cases, trust is a relationship between the participants in an institutional context and connects them to facilitate exchanges (ibid). Much of the research on inter-organizational trust development is focused on economic and commercial settings (Klijn, Edelenbos & Steijn, 2010) and dyadic relationships (Stevens, MacDuffie & Helper, 2015).

Some authors have argued that digital network arrangements in non-commercial settings (such as the one we study) might require a distinct approach to understanding trust development (Klijn, Edelenbos & Steijn, 2010; Stevens, MacDuffie & Helper, 2015). For instance, Granovetter (1985) claim that trust cannot be intentionally built. However, there are multiple forms of trust, and some do not require interpersonal contact. Examples of trust types include institution-based trust (Williamson and Griffiths, 1996), characteristic-based trust (Zucker, 1986), general trust based on norms, and third-party relationships (Ferrin, Dirks, & Shah, 2006), all of these do not require interpersonal contact. Since trust development in our case deals with a form of trust generated in short and intense instances of interaction, we will acknowledge 'swift trust' as one of the three contingencies that we seek to account for in our study. Swift trust is "a unique form of collective perception and relating that is capable of managing issues of vulnerability, uncertainty, risk and expectations" (Meyerson, Weich and Kramer, 1996, p. 167). *Trust-Building* usually is a slow process (Zucker, 1986), but swift trust may develop over short, intense periods of interaction in temporary groups (Meyerson, Weick, & Kramer, 1996).

2.6.3. Commitment to the Collaborative Process

Commitment to the Collaborative Process is the motivation to participate in Collaborative Governance. Although the literature varies on this, it does suggest that an actor's level of commitment to collaborate is a critical variable in explaining success or failure (Day and Grunton, 2003; Margerum, 2001; Tett, Crowther & O'Hara, 2003). In a survey of American and Australian collaborative groups, Margerum (2002) found that member commitment was the most crucial factor facilitating collaboration. For instance, public agencies' weak commitment to collaborate, particularly at the headquarters level, is often seen as a problem (Wondolleck and Yaffee, 2003). Nevertheless, actors may wish to make sure their perspective is not neglected or secure legitimacy for their position to fulfill a legal obligation, et cetera. By contrast, commitment to the process means developing a belief that good faith bargaining for mutual gains is the best way to achieve desirable policy outcomes (Burger et al. 2001).

Commitment also poses a tricky dilemma in that the Collaborative Process requires an up-front willingness to abide by the deliberation results, even if they should go in the direction that an actor does not fully support (Ansell and Gash, 2008). Of course, the consensus reduces the risks for actors. Nevertheless, the dynamics of bargaining can lead to unexpected directions, and actors can experience pressure to conform to positions they do not fully embrace (Saarikoski, 2000). Therefore, commitment depends on the trust that other actors will respect their counterparts' perspectives and interests. Commitment to the Collaborative Process is a variable within the Collaborative Process that is dependent on three other sub-variables: *mutual recognition of interdependence*, the *shared ownership* of the Collaborative Process, and the actors' *openness to exploring mutual gains*.

2.6.3.a. Mutual recognition of interdependence

Ansell and Gash do not give much information on this, except that the mutual recognition of interdependence between actors helps achieve commitment to the process. Additionally, interdependence perceptions often depend upon a political/social context (Short and Winter, 1999). In practical terms, *mutual recognition of interdependence* can only occur when two or more actors share in the opportunities and constraints shaped by the prevailing environmental factors, e.g., economic, social, political, and environmental conditions (Saarikoski, 2000).

Often, collaboration is initiated because of such factors and perceived as a threat or crisis where a new legal mandate or the availability of new resources are needed. When an initial commitment to collaborate has been made, a 'problem-setting' phase occurs when groups with legitimate stakes are identified. The nature of the joint problem or issue they face is articulated (Gray, 1989). Any costs incurred by one member of the collaborative network will be borne by all the network members,

resulting in lower performance levels if one actor acts opportunistically (Thompson, 1967; Provan, 1993).

2.6.3.b. Shared Ownership of the Process

An additional dimension of commitment is called ‘ownership of the process.’ According to Ansell and Gash (2008), *shared ownership* implies the shared responsibility for the *Collaborative Process*, meaning that actors fully accept each other’s roles and share the burden of success of the *Collaborative Process*, as well as its risks. In the typical adversarial or managerial process, nonstate actors are outside observers of traditional decision making. They may seek to lobby, pressure, or influence public agency decision-makers, but it is the agency that is ultimately held responsible for policy outcomes.

Bittner and Leimeister (2013) wrote that confusion exists in the literature on *shared ownership*, antecedents and effects, and how sharing responsibility can be operationalized among actors attempting to collaborate for the first time. “The ability of multiple agents to coordinate their behaviors concerning each other in order to support the realization of common goals or objectives” (ibid, p. 107).

Shared ownership encompasses various aspects to building commitments to the process of collaboration, e.g., “similarity, agreement, convergence, compatibility, commonality, consensus, consistency, and overlap” (Mohammed, Ferzandi and Hamilton, 2010, p. 6). *Shared ownership* may be hindered by power imbalances or different perceptions about who should take the initiative and lead. Groups engaged in collaborative work need to have some knowledge and understanding in common to work productively (Geoghegan and Renard, 2002). A high interdependence among the actors is likely to enhance commitment to collaboration, but it may also enhance incentives to act manipulatively and co-actively. These temptations are checked where collaboration is not a one-off deal but depends on ongoing cooperation (Weech-Maldonado and Merrill, 2000). Essentially, *shared ownership* is a frame of mind that the actors must achieve through good faith bargaining (Ansell and Gash, 2008).

2.6.3.c. Openness to Exploring Mutual Gains

Another critical element to establishing commitments to the *Collaborative Process* is the actors’ openness to explore mutual gains through reciprocity, relationships, learning, and creativity.

Establishing a commitment to the process means developing a belief that good faith bargaining for *mutual gains* is the best way to achieve desirable policy outcomes (op cit. Ansell and Gash, 2008; Burger et al., 2001). Such a belief is not altruistic. For instance, a construction developer may believe that the best way to get his houses

built is to engage in a reasonable faith bargaining effort with environmentalists. However, exploring mutual gains to collaboration can still require a very significant psychological shift, particularly among those who regard their positions in absolute terms (Ansell and Gash, 2008). This is tied closely to the *mutual recognition of interdependence* since such a shift requires 'mutual recognition' (Saarikoski, 2000) or 'joint appreciation' (Gray, 1989) of the actors and their shared situation.

Vangen and Huxham (2003a) argue that leadership is vital for embracing, empowering, and involving actors in good faith bargaining and discouraging the temptation to manipulate the situation. The legitimacy of the process depends, in part, upon stakeholders' perceptions that they have gotten a fair hearing (Ansell and Gash, 2008). Clear and consistently applied ground rules reassure actors that the process is fair, equitable, and open (Murdock, Wiessner, and Sexton 2005). According to Innes and Booher (2003), having an openness to exploring mutual gains is a way of establishing new networks through which capabilities can be developed and sustained. It is a crucial variable to establishing commitments.

2.6.4. Shared Understanding

The *Collaborative Process* actors must develop a shared understanding of what they can collectively achieve (Tett, Crowther, and O'Hara, 2003). *Shared Understanding* is described as having a joint mission or common ground centered around an alignment of core values (Alexander, Comfort & Weiner, 1998). Although the terminology for *Shared Understanding* varies in the literature, past research suggests that the level of commitment to collaboration is evident in the efforts to trust and mitigate each actor's risks to collaboration (Day and Gunton, 2003; Tett, Crowther and O'Hara, 2003).

According to Ansell and Gash (2008), achieving shared understanding can be tricky since actors must own the impetus for working together. Essentially, this requires achieving 'buy-in' among the actors and acknowledging that they can collectively achieve their goals by addressing new social contracts and policies (Tett, Crowther and O'Hara 2003; Blomqvist, Hurmelinna and Seppänen, 2005). This is determined by measuring the "alignment of core values" that foster a shared ideology (Ansell and Gash, 2008, p. 560). The development of a common framework is also a larger part of the *Collaborative Process* since actors must learn from each other and develop a joint knowledge base about their mutual problems (Blatner et al., 2001). Developing a *Shared Understanding* is one of the variables that are critical to the success of the *Collaborative Process*, and it is characterized in three sub-variables: *Defining a Clear Mission*, a *Common Problem Definition*, and the *Identification of Common Values*.

2.6.4.a. Defining a Clear Mission

The first step to creating a shared understanding in collaborations is the need for actors to define a clear mission that brings them together in the first place. Ansell and Gash (2008) loosely define this as an explanatory factor for defining what actors can collectively achieve together (p. 561). Ansell and Gash (2008) define a 'clear mission' as variously described by other authors. For example, 'common mission' (Alexander, Comfort, and Weiner 1998), 'common ground' (Wondollock and Yaffee, 2000), 'common aims' (Vangen and Huxham, 2005), 'common objectives' (Padilla and Daigle, 1998), 'shared vision' (Walter and Petr, 2000), 'clear goals' or a 'clear and strategic direction' (Margerum, 2002). Shared understanding can also imply agreement on a definition of the problem (Bentrup, 2001).

Despite its vagueness, defining a clear mission does appear in other literature as well, were it given a better characterization. For instance, Lang (2016) studied policy formulation wherein "the use of many different policy instruments by UK governmental departments seem to have a strong impact on Collaborative Governance. They provide clear mission statements, increased trustworthiness, and can generate clear responsibilities" (p. 22). Blatner et al. (2001) also developed studied collective learning in education that resulted in the formulation of a joint mission definition. In our case, we will not complicate the matter and refer to defining a clear mission as the first variable needed among actors to develop a shared understanding within the Collaborative Process's larger context. This is achieved via consensus building and occurs as part of the collective issue's problematization for which a set of actors meet.

2.6.4.b. Common Problem Definition

Common problem definition is also broadly defined in Collaborative Governance literature, where Shared Understanding is discussed as a part of the Collaborative Process (Ansell and Gash, 2008; Gray, 1989; Fung and Wright, 2001). Problematization poses that knowledge as a problem, allows new viewpoints, consciousness, reflection, hope, and action to emerge (Crotty, 1998). In this sense, we view that actors engage in the process of demystifying the knowledge about a problem by drawing on specialized or technical knowledge and pooling different interpretations together to arrive at a common understanding.

In practical terms, collaboration involves several phases shaped by prevailing economic, social, political, and environmental conditions (Watson, 2004). Often, collaboration is initiated due to several factors, such as a perceived environmental threat or crisis, a new legal mandate, or the availability of financial incentives (Emerson, Nabatchi, & Balogh, 2012). When an initial commitment to collaborate has been made, a 'problem-setting' phase occurs when groups with legitimate stakes are identified. The nature of the joint problem or issue they face is articulated

(Gray, 1989). Therefore, we define *standard problem definition* as a process of problematization, which is the crux of developing *Shared Understanding* as actors must acknowledge they face a common problem, demystify it, and arrive at common terminologies and knowledge solving it.

2.6.4.c. Identification of Common Values

Identification of common values implies the 'alignment of core values,' 'shared ideology' and 'common purpose' (Tett, Crowther, and O'Hara, 2003) that actors must attain from problematizing the hand and define a clear mission for addressing the said issue. For instance, Sabatier and Jenkins-Smith (1993) have pointed out that developing a shared understanding of policy problems across stakeholders or interest groups is contingent upon the types of core beliefs or values the groups hold. When the core values of different actors are more closely aligned, they are more likely to work together toward policy change (ibid). More parties are likely to benefit and are interested in collaboration in situations where problems are relatively severe yet where improvements are still feasible (Ostrom, 2014).

Ostrom (2014) also finds a shared long-term vision of how a common resource benefits a community can achieve different actions together. Similarly, Heikkila and Gerlak (2005) found that relationships' ecosystems may provide multiple and conflicting benefits and various actors in complex collaborative systems. For instance, an actor who may not even live near a shared resource, such as a river, can gain access or authority over it if their identification of shared values aligns with its management's collective solution. Therefore, *common values* are the alignment of common purpose that benefits collective decision-making. This is a sub-variable to *Shared Understanding* that often occurs in tandem with *defining a clear mission* and *standard problem definition*.

2.6.5. Intermediate Outcomes

Intermediate outcomes represent tangible outputs from the *Collaborative Process* that justify continued collaboration. These "small wins," as Ansell and Gash (2008, p. 550) call them, can feedback into the *Collaborative Process*, encouraging *Trust Building* and *Commitment to the Process*. Furthermore, suppose the *Intermediate Outcomes* can be reproduced with regularity if properly incentivized (Rogers et al., 1993; Rogers, 1995; Vangen and Huxham, 2005). Ansell and Gash (2008) observed several case studies that suggest that this is more likely when the possible purposes and advantages of collaboration are evident. For example, joint fact finding is a type of intermediate outcome that builds consensus and can be repeated easily (Saarikoski, 2000). Although these may represent small tangible outputs in themselves, intermediate outcomes are critical for building the momentum needed for endorsing a governance design that improves future collaborations.

Intermediate Outcomes also affect the sense of ownership that implies a shared responsibility for the *Collaborative Process*. It requires participants to see their relationship with others as sharing a ‘problem.’ This can hinder commitments if power imbalances are already a factor or if participants are averse to adopting the risks of failure (Wondolleck & Yaffee, 2003). Mandated forms of collaboration may be critical where incentives to participate are weak, but it can also disguise the lack of real commitment (Weech-Maldonado and Merrill, 2000). Therefore achieving ‘buy-in’ is essential to enhance commitment to collaboration and mitigate the incentives to act manipulatively (Geoghegan and Renard, 2002). In our interpretation, this means the actors’ willingness to collaborate and agree on continuing to collaborate in repeating cycles interaction and generating results.

2.6.5.a. Small Wins

Ansell and Gash (2008) stated that collaboration is more likely when ‘small wins’ or intermediate outcomes from the collaboration are possible. The guiding perspective behind *small wins* is the idea of making progress by accumulating incremental milestones in which linear policy development approaches are replaced by complex non-linear systems thinking (Termeer and Dewulf, 2019). This perspective is rooted in social theories on sensemaking in policy science (Weick, 1995).

In policy science, for instance, Lindblom (1959) introduced the incremental method, defined as ‘continually building out from the current situations, step by step and by small degrees’ (p. 81). This method, also referred to as ‘muddling through,’ was based on his analysis of the unrealistic expectations of making rational, comprehensive decisions given the cognitive limitations regarding complex problems and conflicts over values (ibid). Lindblom (1979, p. 520) also refers to this line when he argued that: “Incremental steps can be made quickly because they are only incremental. They do not rock the boat, do not stir up the great antagonisms and paralyzing schisms, as do proposals for more drastic change (p. 520)”.

Discarding *small wins* is also a significant risk for actors that tend to observe only the processes and results of what they had thought would happen given their expectations and activities (Ansell and Gash, 2008). Many *small wins* may go unrecognized, may not be taken up, and may never become institutionalized (ibid). Therefore, the first step is to identify and value these emerging small steps. It is not easy to identify small wins, as they typically emerge under public attention radar and are hard to find. However, Termeer and Dewulf (2019) provide a helpful characterization of small wins indicators that we can apply in our case. These are given in Table 1:

Table 1: Characteristics and indicators of small wins

Characteristic	Indicator	Contra-indicator
Concrete outcomes	Visible results	Promises and ideas only
In-depth changes	Second- and third-order change	More of the same
	Radical new practices	Quick wins
		Low hanging fruit
Moderate importance	Micro or local level	Large scale
	Intermediate	Best practice
Positive judgement	Improvement	Small loss for many actors
	Step forwards	
	Related to shared ambition	

Source: Termeer and Dewulf, 2019

2.6.5.b. Strategic Plans

A collaboration might involve only sharing information but could develop into matching separate service plans to a joint strategic 'plan' for addressing a complex problem (Ansell and Gash, 2008). Collaborations typically start with two or more organizations networking. The extent of further movement will depend upon organizational aims, constitutions, accountability systems, and participants' skills and motivations (Nocon, 1994). Whatever type of collaborative relationship is entered into, a balance will need to be drawn between the partners' accountability to their respective parent organizations and the collaborative forum. Vangen and Huxham (2006) use the term 'collaborative inertia' to describe a situation in which the apparent rate of work output from a core group is much less than might be expected, and they relate this to ideas about accountability and reduced autonomy. They further argue that the frustration created by 'collaborative inertia' may lead those involved to give up -- a state they call 'partnership fatigue' (p. 247). Such a situation can arise when the distance between the parent organizations and joint projects becomes so great that the collaborative actors find themselves in limbo (Lawrence, Hardy, and Phillips, 2002). The dilemma is to accord members of collaborative forums as much power to act in the collaborative endeavor's interests as is consistent with the parent organizations' interests (Hudson and Hardy, 2002).

2.6.5.c. Joint Fact-Finding

Joint Fact-Finding is an activity that occurs concurrent to strategic planning and small wins. In the literature, *Joint Fact-Finding* is described vaguely, but it is commonly described in policy science literature as a client-focused perspective often shaded by delicate nuances (Ehrmann and Stinson, 1999; Andrews, 2002). For instance, Andrews (2002) characterized *Joint Fact-Finding* as an analytical activity carried out by individual experts of a field (e.g., resource management or information management). *Joint Fact-Finding* is used frequently in firms, urban planning boards, regulatory agencies, courtrooms, legislative chambers, and international treaty negotiations (Ehrmann and Stinson, 1999). Given the breadth of practice, it is

reasonable to broadly employ the term as a process in which actors with different interests work together to develop a shared information base for making decisions.

In a collaborative environment, the multi-party decision process of many types may include *Joint Fact-Finding*, as it is a crucial component of participatory management, communicative planning, and discursive democracy (Lindbolm, 1979; Wondolleck and Yaffee, 2003). In contemporary usage, *Joint Fact-Finding* is a method for helping actors grappling with technically intensive policy and planning challenges to collaboratively engage in research and arrive at shared sets of facts to inform their decision-making. *Joint Fact-Finding* is typically conducted by experts and can provide value by revealing the practical applicability of collaboration outcomes, e.g., the inherently contingent nature of addressing a complex problem and question of representation from actors involved in its resolution (Schenk, 2016). This characterization fits reasonably for our study, and we will therefore refer to it when analyzing our cases for how they handled *Joint Fact-Finding* in the process of generating *intermediate outcomes*.

2.7. COLLABORATIVE OUTCOMES

The collaborative outcomes relate to the final output of the Collaborative Process. A defining characteristic of these is the focus on governance problem-solving capacity. Kettl (2002) argues this is the primary challenge in public management—developing the systems and personnel able to integrate collaboratives or horizontal systems, with the traditional vertical, specialized, and functional systems that dominate... [traditional] bureaucracy (Agranoff and McGuire, 2003).

Put differently, outcomes are either about legal compliance and improved substantive policy outcomes (e.g., improved environmental quality) or about the development and application of innovative new methods for developing the capacity to resolve difficult policy problems. Nevertheless, whereas Kettl (2002) and others working in the literature focus primarily on systemic properties such as what the networked system looks like and how it works, the outcomes literature focuses on the effects of building such capacity.

Another critical characteristic of the literature on collaborative outcomes is the variance in the theoretical perspectives (Wood and Gray, 1991) and the different outcomes at different stages (Bingham, Nabatchi and O'leary, 2005). Some scholars (Gray, 2000; Thomson, Perry, and Miller, 2007) have made efforts in understanding how and why Collaborative Governance arrangements contribute to improved process outcomes (e.g., getting diverse interests to make jointly agreed decisions) and social outcomes (Gray, 2000; Leach and Sabatier, 2005).

Gray (2000) also identified and used two other innovative approaches to collaborative outcomes—changes in network structure and shifts in power distribution—that affect systemic, collaborative capacity and the types of outcomes produced. Typically, *Collaboration Outcomes* will result in lessons learned or some process being improved. As Bryson, Crosby, and Stone (2006) noted, “the point of creating . . . cross-sector collaboratives ought to be the production of ‘public value’ that cannot be created by single sectors alone” (p. 51). The ideal Collaborative Outcome is where the actors resolve their differences, agree on addressing a joint problem, and solidify that solution in a permanent policy or standardization for repeating their success.

2.8 SUMMARY

The chapter introduced the theoretical literature of Collaborative Governance and its use in public management and policy-making in complicated problem settings. As stated, Collaborative Governance has been applied to cases dealing with both governmental and civil stakeholders in multi-lateral problems that cannot be resolved unilaterally. The chapter continued by introducing Ansell and Gash’s Collaborative Governance Model (CGM), which is composed of several variables and their sub-variables. Each variable is an integral part of the overall *Collaborative Process*, and it is that process that will help sketch the collaborations between the HROs and V&TCs. The next chapter will give the methodological considerations and elaborate on the data type used in this study and how it was organized and coded.

3

HROs AND V&TCs
IN INFORMATION MANAGEMENT
FOR HUMANITARIAN AID

The chapter introduces the empirical setting, which is essentially the information management space of humanitarian deployments. Information management is both a setting and a concept that adds complexity to the collaborations involving the Humanitarian Response Organizations (HROs) and Virtual and Technical Communities (V&TCs). This chapter minimizes that complexity by explaining the dimensions influencing information management in humanitarian aid and how they affect how the collaborations occur. The chapter will also clarify big data and social media's role in humanitarian deployments and how those are leveraged via collaboration.

The chapter will first introduce the types of actors that concern the collaborations we are talking about: Humanitarian Response Organizations (HROs) and Virtual and Technical Communities (V&TCs). Then we introduce the two representing cases of the HROs and V&TCs, one from each: The United Nations Office for the Coordination of Humanitarian Affairs and the Digital Humanitarian Network. The two serve as prime examples of successful collaborations that resulted in greater activism in favor of humanitarian innovation². In other words, UNOCHA and DHN serve as examples that reinforce the call to modernize traditional information management flows with big data and social media and the technical know-how to make sense of such data in disasters. Finally, the chapter will describe what information management is within the context of humanitarian aid and the role of social media and big data.

3.1. HUMANITARIAN RESPONSE ORGANIZATIONS

Humanitarian Response Organizations or 'HROs' are the professionalized agencies or organizations that possess an international mandate as guarantors of humanitarian aid and together lead humanitarian action and devise policy for the entire global humanitarian field. These organizations are typically a part of or attached to the United Nations and the International Red Cross and Red Crescent Movements (Buchanan-Smith, 2003; United Nations, 2015). The term is drawn from Duffield's (2007) definition of "transnational and western non-governmental organizations active in the humanitarian space" (p.143). The coining of the concept of a 'humanitarian space' [...] a symbolic area [...] connected by access, dialogue, independence, and impartiality" (p. 43).

We distinguish the UN aid agencies and Red Cross organizations as HROs due to the diluting of the term 'Non-Governmental Organization' or 'NGO.' This is because of the explosion of new organizations between the 1990s and mid-2000s. Between 1994 and 2005 saw a sharp increase in non-profit organizations claiming to be

2 Humanitarian Innovation is a blanket term used to describe practically any means adapting or improving humanitarian aid and related affairs through new business models and technology.

NGOs and operating globally in the name of human rights, environmentalism, cultural preservation, and other causes on behalf of moral order (Shahi, 2013). “Each fighting for a role in the global meritocracy of suffering” and virtually independent of the United Nations and the Red Cross and Red Crescent Movements (ibid, p. 14). It is for this reason that we define HROs separately from NGOs. This separation is not a formal distinction, as UN/Red Cross aid agencies/organizations refer to themselves as ‘International-NGOs.’ However, their distinction does not offer a clear line between professional humanitarian agencies from charitable humanitarians that form their organizations.

Over the past decade, the debate has arisen over the relative roles of the HROs. While they have authority as international bodies to lead humanitarian aid missions, they are heavily dependent on the support of other well-established NGOs such as Oxfam, Amnesty International, CARE International, and Catholic Relief Services (Wong, 2012). Many NGOs have useful knowledge and resources that are not a part of the United Nations or the Red Cross (Stoddard, Harmer and DiDomenico, 2009; Stokke, 2009). For instance, many corporations and private interests, including UPS, Walmart, Vodafone, Google, The Gates Foundation, USAID, have philanthropic wings that have emerged as contributors to humanitarian aid (Crum et al., 2011). These mentions are noteworthy because humanitarian aid encompasses a massive spectrum of actors that the HROs depend on for support despite their role as authority figures of humanitarian doctrine. Therefore, this manuscript acknowledges that the non-UN/Red Cross NGOs and non-profit organizations’ presence is significant. However, the context of this study deals with the agencies that lead humanitarian action--HROs.

Part of the challenge of standardizing collective humanitarian action is establishing leadership around which humanitarian aid contributors can be coordinated. Therefore, the United Nations became a leading body in humanitarian aid ‘deployments.’ That role has expanded to consolidate the ‘humanitarian space’ into a formal sector loosely organized by powerful institutions (Barnett, 2013). Consequently, ‘humanitarian deployment’ has become a term used by United Nations and Red Cross professionals to define humanitarian aid’s decentralized mobilization (Wood and Frazier, 2019). Together, their agencies compose the core leadership for humanitarian aid. The HROs consist of eight United Nations agencies, two organizations from the Red Cross and Red Crescent movements, and one specialized NGO that maintains a consultative status in the United Nations:

World Food Programme (WFP)

The WHP is the food assistance branch of the United Nations. It is one of the largest humanitarian organizations in existence, and it is responsible for food security and emergency food relief in humanitarian interventions. WHP also offers

technical assistance and development aid, such as building capacity for emergency preparedness and response, managing supply chains and logistics (World Food Programme, 2016).

The United Nations Children's Fund (UNICEF)

UNICEF is the United Nations' agency responsible for providing development aid to children worldwide. The agency is among the most widespread and recognizable social welfare organizations globally, operating in 192 countries and territories (United Nations Children's Fund, n.d.).

United Nations High Commissioner for Refugees (UNHCR)

The UNHCR is the United Nations Agency mandated to aid and protect refugees, forcibly displaced communities, and stateless people. They assist in their voluntary repatriation and integration in local resettlements in developing countries throughout the world (United Nations High Commissioner for Refugees, n.d.).

International Organization for Migration (IOM)

The IOM is an intergovernmental organization that provides services and advice concerning migration to world governments that concern internally displaced persons, refugees, and migrant workers. It became a part of the United Nations nominally in 2016 (Bradley, 2017).

World Health Organization (WHO)

The WHO is a specialized agency of the United Nations responsible for international public health. Its current priorities concern communicable diseases around the globe. The WHO works to provide the needed health and well-being evidence through various data collection platforms, including the World Health Survey (World Health Organization, n.d.).

Food and Agriculture Organization (FAO)

The FAO is a specialized agency of the United Nations that leads international efforts to defeat hunger and improve nutrition and food security worldwide. It helps governments and development agencies coordinate their activities to improve and develop agriculture, forestry, fisheries, land, and water resources (Kenton, 2020).

United Nations Development Programme (UNDP)

The UNDP is the United Nations' global development network that promotes technical and investment cooperation among nations. It works with nations on their solutions to global and national development challenges. The UNDP builds local capacity by brokering development projects among various partners (United Nations Development Programme, n.d.).

United Nations Office for Disaster Risk Reduction (UNDRR)

The UNDRR is part of the United Nations Secretariat responsible for implementing and reviewing the Sendai Framework for Disaster Risk Reduction adopted by the United Nations at the Third Conference on Disaster Risk Reduction in 2015. UNDRR coordinates international efforts in disaster risk reduction and reports implementing that activity (UNDRR, n.d.).

Save the Children Foundation

Commonly known as 'Save the Children,' it is one of the oldest humanitarian organizations founded in 1919 to improve children's lives through better education, health care, and economic opportunities. It currently provides emergency aid in natural disasters and conflicts and has been a presence for coordinating emergency relief efforts since before the United Nations was founded. Although not a UN agency, it holds a special consultative status in the United Nations Economic and Social Council, which entitles it to weigh in on policy formulation concerning humanitarian affairs (Save the Children Foundation, n.d.).

International Federation of Red Cross and Red Crescent Societies (IFRC)

The IFRC is a worldwide humanitarian aid organization with a long history of emergency relief delivery. It organizes trained volunteer networks in a range of expertise dealing with independence and neutrality to reach countries with chronic humanitarian needs. The IFRC coordinates between hundreds of affiliated organizations worldwide to support humanitarian goods access to beneficiaries of aid. It is not a part of the United Nations. However, it has a long history of cooperation. It typically has a hand in formulating humanitarian policy regarding coordination and principled access with host-countries (International Federation of Red Cross and Red Crescent Societies, n.d.).

International Committee of the Red Cross (ICRC)

The ICRC is part of the International Red Cross and Red Crescent Movements along with the IFRC. It is the oldest and most recognized organization within the movement and the most widely recognized humanitarian organization globally. The ICRC is the only institution explicitly named in international humanitarian law as a controlling authority. It is responsible for formulating humanitarian policy that coordinates its affiliates with the United Nations in humanitarian deployments (International Committee of the Red Cross, 2005).

These HROs have official international mandates as guarantors of humanitarian aid, and they set policy for its coordination. They are the critical stakeholders of aid delivery's organizational landscape (not to be confused with aid recipients). In the organizational sense, HROs are large bureaucracies that can bring significant resources to bear in disasters. They are distinguishable from NGOs in that they

are mandated explicitly for humanitarian deployments. Like military organizations, HROs are not monolithic, and they have complex organizational structures with many interests that compete (Duffield, 2007). For instance, existing political and administrative (hierarchical/vertical) structures favor agency-specific rewards instead of cross-cutting or holistic policy outcomes (Kettl, 2002). Therefore, the humanitarian aid is decentralized to allow flexible cooperation among organizations via the leadership of the HROs in several divided sectors of activity, which are explained in the next sub-section.

3.1.1. The UN Cluster System and Humanitarian Aid

The UN Cluster System is the concept of the HROs collectively as a network and a framework for structuring collaborations from the diaspora of non-profits, NGOs, charities, government agencies, militaries, et cetera. It is essentially an attempt to unify the world's humanitarian capacities through a coordinated consensus that broadly follows the United Nations' and the Red Cross's interpretation of formal 'humanitarian aid.' The term 'humanitarian aid' distinguishes relevant actors in a disaster or crisis to enable Non-Governmental Organizations (NGOs) and specialized, Humanitarian Response Organizations (HROs) an influential voice in shaping humanitarian policy decision making.

'Modern' humanitarian aid has been an evolving field strongly affected by the acceleration of information technologies and practices that involve public users. While the beginning of that evolution can be traced to the Haiti response of 2010, the field's bureaucratic conceptualization takes its roots from highly publicized humanitarian failures of the 1990s, namely Rwanda and Darfur. For instance, a study by UNOCHA on the coordination of humanitarian aid also found that agencies tended to mold the emergency to their image, favor their program rather than focus on the overall response, and interpret coordination as control (Stoddard et al., 2007). Failures to address issues on the ground tended to be due to agencies having insufficient control to compel others to coordinate and insufficient consensus-building efforts to persuade others to share information (Reindorp and Wiles, 2001).

The result of these events led to the expansion of the Hyogo Framework for Action 2005-2015 in support of UN Resolution 46/182, which formalized responsibility for humanitarian interventions to the United Nations and the Red Cross and Red Crescent movements (Wong, 2012). Concurrently, the United Nations implemented a new systematic method that sought to reduce the amount of overlap and gaps in assistance and promoted a multifaceted approach to a cooperative structure referred to as the 'United Nations Cluster System.' This method sought to bring about "...predictability, responsibility, accountability and partnership in all areas of humanitarian action" within the United Nations and the Red Cross (Gagnet, 2017, p. 18).

With the adoption of this new type of management guiding humanitarian aid “... [a] group of organizations coalesced around a common area of work...” paired with “...a spirit of inclusivity and partnership where all stakeholders are transparently and mutually accountable for what they do” (ibid). These were the HROs, and the UN Cluster System’s success became based on their participation to lead collective responses to disasters.

The UN Cluster System is an organizational landscape and a framework for governing humanitarian aid [both in logistics deployment and information management] and over a dozen activity sectors (Ngamassi, Maitland & Tapia, 2014; UNOCHA, 2016). The UN Cluster System is a network of several HROs that segregate roles and resources into distinct sectors to which NGOs are supposed to cluster around, depending on their expertise. These ‘clusters’ then form the sector of activity that the HROs essential govern during humanitarian deployments (“A/RES/46/182”, 1991; “What is the Cluster Approach?”, n.d.).

In this manuscript, the reference to the UN Cluster System proper refers to the collective network of HROs due to their role in leading each sector. HROs are also active in structuring coordination policy through the Inter Agency-Standing Committee or ‘IASC.’ Therefore, coordination in humanitarian aid is loosely defined on “the belief that a coherent approach to emergency response will maximize its benefits” (United Nations Office for the Coordination of Humanitarian Affairs, 1999, p.18).

The UN Cluster System was devised and implemented by the IASC, a committee of representatives from each HRO. They meet to formulate policy to strengthen humanitarian aid to achieve the coherency above humanitarian deployments (Steets et al., 2010). The IASC is essentially the UN Cluster System’s representative body that regulates humanitarian aid coordination structure according to the policies that the HROs negotiate amongst each other.

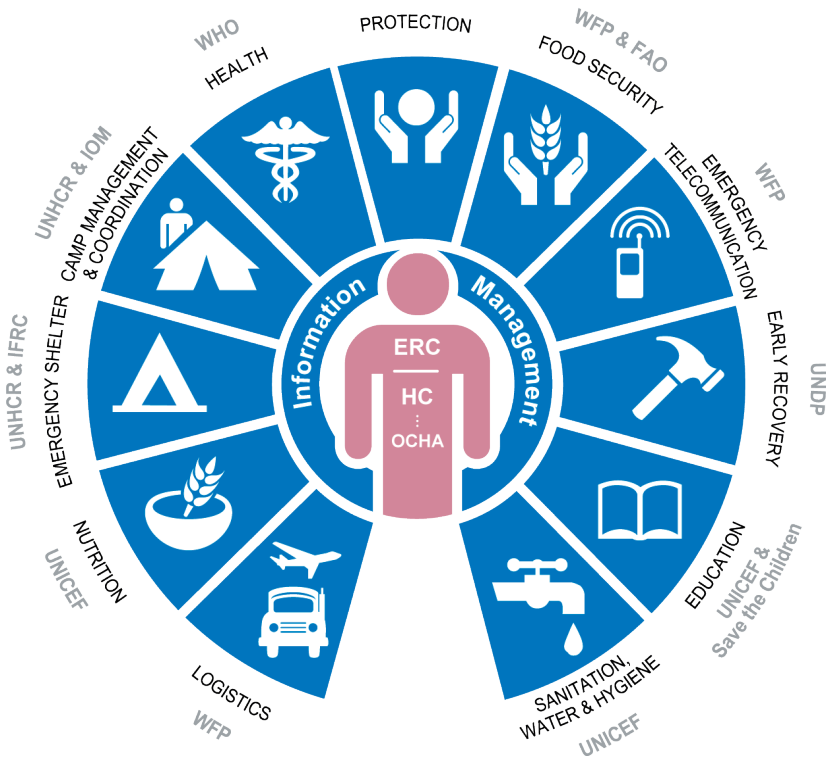
The IASC is essentially responsible for recognizing non-UN NGOs as part of the ‘formal’ humanitarian aid sector that the UN Cluster System coordinates and governs. As mentioned in Chapter One, the IASC qualifies other organizations based on their formalization as legal entities. Said formalization is necessary for the HROs to engage in partnerships with NGOs and other actors. The UN Cluster System was designed and implemented to streamline humanitarian deployments by segregating operations into ten distinct activity sectors. According to their given mandate, each sector is led or governed by the HROs (Inter-Agency Standing Committee, 2015). A list of these sectors of activity and their leading HRO is given below:

Division of clusters and their lead HROs:

- Logistics –World Food Programme.
- Nutrition—The United Nations Children's Fund.
- Shelter—United Nations High Commissioner for Refugees.
- *Camp Coordination and Camp Management (Deployment management)*—International Organization for Migration/ United Nations High Commissioner for Refugees.
- Health—World Health Organization.
- *Protection [Personnel Security]*—United Nations High Commissioner for Refugees.
- Food Security—World Food Programme/ Food and Agriculture Organization.
- Emergency Telecommunication—World Food Programme.
- Early Recovery—United Nations Development Programme.
- Education—The United Nations Children's Fund/Save the Children Foundation).
- Water, Sanitation and Hygiene—The United Nations Children's Fund.

The UN Cluster System's objective is to distinguish each HRO as the leading body that governs each activity sector. They are responsible for coordinating all related activities, including information sharing with other NGOs, national governments, militaries, or other relevant actors that might be working in these sectors (Balcik et al., 2010). Figure 6 illustrates the division of the sectors and their leading organization.

Figure 6: United Nations Cluster System Approach to Crisis management
UNHCR



Source: UNOCHA, "Humanitarian Cluster System," 2016.

Each of these sectors or 'clusters' are independent of one another and the HROs assigned to lead them to determine their standardization of information workflows. Each sector is isolated, and operations often became siloed into unique routines, methodologies, policies, and interpretations for what constitutes success. The procedures for coordinating deployments will be different for each cluster. The information collected and compiled will manifest as a mosaic of individual projects whose leaders define their work arrangement amid the shifting priorities of a disaster (Stoddard et al., 2007). The IASC has sought to address this by encouraging newer guidelines that promote collaboration (UNISDR, 2005; Lohne and Sandik, 2017). Part of that effort was appointing the United Nations Office for the Coordination of Humanitarian Affairs as the guarantor of coordination in humanitarian deployments.

3.1.2. The United Nations Office for the Coordination of Humanitarian Affairs

The United Nations Office for the Coordination of Humanitarian Affairs or 'UNOCHA' is part of the United Nations Secretariat responsible for bringing together HROs to ensure a coherent response to emergencies. UNOCHA was officially established

in 1998 for coordination, advocacy, policy development, information management, and financing tools to encourage rapid humanitarian deployments (Stumpfenhorst, Stumpfenhorst, and Razum, 2011). It has been instrumental in providing highly competent and experienced people at the UN Cluster System service to act as experts advising in using complementary information technologies. As of June 2016, UNOCHA fielded 2,300 staff spread across the world in over 60 countries (UNOCHA, 2016).

UNOCHA has been given an international mandate based on General Assembly Resolution 46/182. Based on the Secretary-General's reform report, it is responsible for three core functions: coordination of humanitarian response, policy development, and humanitarian advocacy. Also, information management and resource mobilization on behalf of humanitarian deployments are critical to OCHA's core functions (ibid). UNOCHA's unique mandate to 'coordinate' the UN Cluster System requires them to balance the donor pressures for devising strategies that align humanitarian action to the political and military strategies on the ground and consolidate and make sense of the different disaster assessment activities conducted by the HROs.

Previous studies on UNOCHA's performance have pointed out significant obstacles to aligning the humanitarian bureaucracy with technology because coordination among HROs is neither required nor rewarded. UNOCHA lacks the administrative procedures to directly support HROs in the field due to structural constraints of an office divided between New York and Geneva and financial constraints partly blamed on weak management (Reindorp and Wiles, 2001). Therefore, UNOCHA staff can only encourage the HROs to work together. With that in mind, the UNOCHA's "Orientation Handbook on Complex Emergencies" (1999) does not clearly understand how international aid strategies can be designed to engender better coordination.

The context of "'humanitarian' aid is a complicated set of social, medical, and political circumstances that require customized or 'ad-hoc' responses to disasters" (United Nations 2005, p. 5). Under this definition, the UNOCHA and other HROs decide for themselves how they can affect humanitarian deployments and engage in rule setting on how that is done on a case-by-case basis. Coming back to its responsibilities over information management and technology, UNOCHA has been very active in testing new information technologies and methods for collecting data about disasters and augmenting those with existing informational processes. UNOCHA's role especially encapsulates the drive for 'humanitarian innovation.' UNOCHA defines a humanitarian innovation as:

“A means of adaptation and improvement through finding and scaling solutions to problems, in the form of products, processes or wider business models... [these] can be applied to nearly any specialized area, from logistics to medicine, to media, and may include technology but is not reducible to it” (Betts et al., 2014, p.5).

The processes and tools developed for humanitarian aid have remained mostly unchanged since the Second World War. Several events, e.g., the Haiti earthquake 2010, the Arab Spring in 2012, humanitarian crises in Eastern Ukraine and Myanmar 2015, et cetera, have demonstrated that the humanitarian system has difficulty coping with the changing needs and nature of modern emergencies (ibid, p. 6). As a result, the HROs need to develop innovative processes, protocols, and tools to adapt to this new reality. Additionally, humanitarian innovation does not need to be an entire invention. It could only be an existing product, process, model, or technology adapted to a new context. This includes new information management flows from social media that can be applied in disaster logistics and reporting. One of the UNOCHA's many humanitarian innovation experiments was supporting the rise of Virtual and Technical Communities (V&TCs), which is the next section's subject.

3

3.2. VIRTUAL & TECHNICAL COMMUNITIES

Virtual and Technical Communities or 'V&TCs' is a derivative of the term volunteer and technical communities that emerged from Haiti's 2010 earthquake response. This is our definition, which we employ here because many of the volunteer networks and loose collaborations that marked the beginning of the digital volunteerism era (2010-2017) formalized to some extent to become virtual non-profit organizations. However, they are not NGOs in the traditional sense, e.g., Oxfam, Save the Children Foundation, or Catholic Relief Services.

The V&TCs are different, even if many of them have filed for NGO status. For this reason, we adopt the term 'Volunteer and Technical Communities' to 'Virtual and Technical Communities' to mark a point in their symbolic formalization (post-2016) from less structured networks to semi-structured quasi-organizations or full NGOs/non-profit organizations. So, in a sentence, Virtual and Technical Communities or 'V&TCs' are the organizations and networks that espouse digital volunteerism, technical innovation, social activism, and humanitarian reform.

Some examples include V&TCs such as MapAction, CartONG, and GISCorp transitioning into becoming full NGOs in their own right, but most of them remained less structured between 2010-2014. A typology of the V&TCs was created by Van Gorp (2014) that offered the most useful example to conceptualize their makeup and what they do. Van Gorp's (2014) work on the barriers to integrating the V&TCs into humanitarian aid has been constructive in the conceptualization of the V&TCs

in this manuscript. Therein, she divided the V&TCs into four categories of activity (software platform development, mapping collaborations, expert networks, and data aggregation) centered around two case examples:

The GISCorps

A V&TC that professionally handles complex information products with technically skilled digital volunteers (GISCorps, 2009). Many of these are often professional disaster responders themselves and have taken the time to devote their focus to informational tasks such as geospatial analysis and crisis mapping.

The StandByTaskForce (SBTF)

A more transparent, flexible, and focused network of experienced community organizers. Digital volunteers in this group can easily range in the thousands depending on the scale of the disaster. SBTF's core staff will train anyone who wants to volunteer and usually perform more mundane tasks such as manual data collection from online sources or image verification (Meier, 2012a). Some of these tasks are so low-level that volunteers can achieve them passively while waiting for a doctor's appointment or bus station.

The differences in these two types of V&TCs are conceptualized in their stated roles. For instance, the SBTF emphasizes the humanitarian aspects of their work through digital volunteers. GISCorps leverages its members' professional credentials to take on geo-information-systems (GIS) projects in humanitarian deployments (Meier et al., 2011; Resor, 2016). These networks are born out of the hyper-connectivity of new digital media use, where digital volunteers and technical experts organize people and resources in virtual collaborations (Solnit, 2009). The work of Van Gorp (2014ab; Van Gorp, Pogrebnyakov, and Maldonado, 2015) also helped to categorize the V&TCs into precise niches, so they are mostly known to perform activities such as software platform development, mapping collaborations, expert networks, and data aggregation.

First, Van Gorp (2014a) described V&TCs that focused on developing software platforms are the oldest activities with which they have been associated. At least three—the Sahana Software Foundation, Frontline SMS, and Ushahidi—were founded between 2003-2008 (ibid). For instance, the Sahana Software Foundation has developed four major software platforms that perform digital registration of missing and found people, tracking requests from affected people, and tracking HROs and NGOs responding to disasters (Van Gorp, 2014b). These software platforms were also used during the 2004 Indonesian Tsunami, the 2005 Pakistan earthquake, the 2010 Haitian earthquake, and the 2012 Chilean wildfires (Prutsalis, 2010).

Second, the mapping collaborations are crucial for the V&TCs, which generated the most publicity between 2010–2014. For instance, *Humanitarian OpenStreetMap Team* (HOT), *Crisis Mappers*, the *Standby Task Force* (SBTF), *Earthquake Engineering Research Institute* (GEOCAN), *Quake Map*, *GISCorps*, and *MapAction*. These V&TCs typically provided crisis maps with an array of available features to support HROs during their deployments. Furthermore, V&TCs offer a contextual analysis of Twitter or SMS data and link these to the maps (Crawford and Finn, 2015). The maps have been used in multiple humanitarian deployments to identify interest locations with supporting contextual information (Van Gorp 2014b). These can be narratives of disaster-affected communities shared over social media, with pictures of damaged buildings and satellite or aerial imagery. Many HROs have used these services, including the World Bank, UNHCR, WFP, and UNOCHA (Digital Humanitarian Network, 2015).

Third, several different expert networks were founded between 2009–2011; these types of V&TCs brought together many experts from various technical and analytical backgrounds (Waldman, Verity & Roberts, 2013). Expert networks vary in the extent to which they focus on aligning activities across V&TCs and HROs in collaborative technology developments (Hiltz, Diaz & Mark, 2011). V&TCs that focus on expert networking include *CrisisCommons*, *CrisisMappers*, *Random Hacks of Kindness*, *Geeks Without Bounds*, and *Datakind* (Jiang and McGraw, 2010). *CrisisCommons*, for example, was founded in 2009 and comprised of a global-informal-network of volunteers focused on advancing the use of open data to stimulate humanitarian innovation (Meier, 2012b).

Fourth, V&TCs comprising those organizations that leverage technology to educate the public about a crisis are known as *Data Aggregators*. These typically bring together information from various sources into situation reports that provide a broad picture of what is going on the ground. Two well-known V&TCs in this respect include *Humanity Road* and *ICT4Peace*. They both aim to develop wikis for HROs, media, and policymakers to be used as public service announcements (Palen, 2008).

Since Haiti, V&TCs have grown significantly in membership, capabilities, and reputation. In the last few years, V&TCs have gathered a significant amount of experience. They now engage in a wide range of activities, from accelerating data processing to delivering unique information analysis not typically available in HROs. In the organizational sense, V&TCs are not as heterogeneous as professional outfits or agencies, and they possessed no legal basis to appear in humanitarian deployments. V&TCs are not emergency professionals but networks of technical professionals and digital volunteers that work together for informational activities related to disasters (Resor, 2016).

Over the last few years, V&TCs have provided disaster support to ‘formal’ HROs and NGOs in the form of material or logistical assistance for humanitarian purposes after a disaster (Starbird, 2012; Van Gorp, 2014a; Meier, 2015). At the time of this writing, several dozen established V&TCs, many of which trained digital volunteers in open-source data collection and analysis. All V&TCs work in some way with “Big Crisis Data—the massive volume of user-generated content publicly shared on social media platforms like Facebook, Twitter, Instagram, and YouTube” (Meier 2015, p. 211). It should be noted that despite their changed legal status, most of the ‘V&TCs’ still draw on open-source ideology and methods that require the assistance of the global public. That is why the term remains interlinked with the term ‘digital volunteerism’ throughout this manuscript. These are different from organizations that espouse public participation in traditional roles, e.g., United Nations Volunteer Programme.

The V&TCs have provided this support by aggregating information, translating messages, geolocation services, and categorizing and publishing online data (Baker, 2014). Nevertheless, they have struggled to gain a foothold as a technological force wedged into a non-technological field (O’Neil and Schutt, 2013; Stanton-Geddes, 2014). By contrast, HROs have little experience in analyzing large amounts of data, and UNOCHA has acknowledged that a critical challenge for the future of humanitarian aid is connecting the V&TCs to the HROs to do such work. Therefore, V&TCs can increase humanitarian deployments’ efficiency, but their rise brings new coordination challenges (Van Gorp, 2014a). A complete list of known V&TCs and their catalog of services will be given in the next subsection on the Digital Humanitarian Network.

3.2.1. Digital Humanitarian Network

The Digital Humanitarian Network or ‘DHN’ is a consortium of virtual & technical communities (V&TCs) that extend technical capacity during humanitarian emergencies. Notable members include the *Humanitarian OpenStreetMap Team* (HOT), the *Standby Task Force* (SBTF), *GEOCAN*, *GISCorps*, and *MapAction*. Although there has never been an accurate accounting of its size, in 2016, DHN consisted of 24-28 regular members (Digital Humanitarian Network, n.d.). The network consisted of member V&TCs that managed networks of technically trained digital volunteers worldwide and can be activated to backstop humanitarian deployments and produce information with limited turn over time (Meier, 2015).

Those methods often dealt with tasks that the V&TCs could complete, including Real-time media monitoring of mainstream and social media, rapid geo-location of event-data and infrastructure data, creation of live crisis maps for information management, and decision support. These often included a series of tasks managed by different actors such as data collection, data verification, and analysis (often

called data cleaning), tagging social media data to GIS satellite imagery, tracing time-sensitive web research, and big data analysis (Chernobrov, 2018)

The DHN was founded in 2012 by Andrej Verity, Patrick Meier, Harvard Humanitarian Initiative, and Ushahidi to consolidate and coordinate the V&TCS to the activities of the HROs. However, its support and structure were borne from liberal movements such as Occupy Wall Street and Occupy Sandy (Brugh, Sorokin & Bar-Yam, 2015). Although not explicitly stated, many V&TCS also draw on social and economic inequity to structure themselves from the grassroots (Zook et al., 2010).

The network initially brought together several V&TCS, including DataKind, ESRI, Geeks-Without-Bounds-GISCorps, Humanitarian OpenStreetMap Team, Humanity Road, MapAction, Statistics Without Borders, StandbyTaskforce, Translators Without Borders, and UNV's Online Volunteering (Capelo, Chang, and Verity, 2012; Verity, 2013). Between 2012 and 2014, the DHN, in collaboration with UNOCHA, served as a façade of visibility and control, facilitating greater communication and visibility with the HROs and between themselves (Verity, 2015). The DHN hosted 28 V&TCS that were known to have existed between 2012-2016. A table of DHN's catalog of members is given in Table 2:

Table 2: DHN Catalogue, 2015

V&TCS	Type	Description
CartONG	Data Aggregator	Self-described as an NGO (unverified legal status) specializing in information management, particularly geographic data, at the service of humanitarian and social action projects.
Connected Development Group (CODE)	Software Platform Developer	Self-described as an NGO that empowers marginalized communities by providing software platforms that increase people's access to information/accountability.
Crisis Commons	Data Aggregator	A global community of digital volunteers specialized in data curation for humanitarian innovation and global development.
Data Kind	Expert Network	A network of digital activists that specialize in data science and big data to solve social problems like food security and homelessness.
Digital Globe	Mapping Collaboration	An American commercial vendor of space imagery and GIS content. The company has a philanthropic network that shares its satellite data in humanitarian crises.
Disaster Tech Lab (DTL)	Expert Network	Self-described as NGO, it is dependent on volunteers that can deploy to disasters around the globe and provide WiFi access to disconnected communities.

Table 2: DHN Catalogue, 2015 (continued)

V&TCs	Type	Description
Geeks Without Bounds (GWOB)	Expert Network	Self-described as an NGO (formalized in 2016) dependent on volunteers, they sponsor hackathons to accelerate humanitarian innovation initiatives.
Geo Things	Software Platform Developer	A software company based in Taiwan that specializes in software and ICT development. They provide platforms to help in disaster data collection.
GNUCOOP	Expert Network	An advocacy group that offers technical expertise and development skills in service to humanitarian aid and development.
Google Crisis Response (GCR)	Mapping collaboration	GCR is a philanthropic team of Google professionals that offer Google resources for mapping collaborations.
Help Earth Foundation (HEF)	Expert Network	Self-described as an NGO, it leverages artistic content in support of charitable efforts to other NGOs. HEF is the outgrowth of Tsunami BandAide, which was established to raise funds supporting the Tsunami relief effort in 2004.
Humanitarian OpenStreetMap Team (HOT)	Mapping Collaboration	An international team dedicated to humanitarian aid and development through open mapping projects. It is one of the oldest and most known V&TCs.
ICT4Peace	Expert Network	Self-described as an international foundation that saves lives and protects human dignity through information communication technologies or 'ICTs' and Big data. It offers capacity-building support through a network of professional technologists that often inform high-level UN meetings on crisis information management.
Info4Disasters	Data Aggregator	A collective of online virtual responders collects and curates qualitative data from standard social media tools, Facebook, Twitter, phone apps, and blogs.
International Network of Crisis Mappers	Mapping Collaboration	A hub for crisis mapping and humanitarian aid. It coordinates communication among other mapping collaborations and serves as a repository of satellite imagery and digital maps. Many academic analyses have made use of their crisis map data.

Table 2: DHN Catalogue, 2015 (continued)

V&TCs	Type	Description
Map Action	Mapping Collaboration/ Expert Network	A United Kingdom (UK) charity founded in 1999, MapAction gained legal NGO status in 2002 and specializes in mapping collaborations by training volunteers in GIS skills, data management, and software development in emergencies. It works closely with national government agencies such as USAID, the UK's DFID, German GFFO, and the Dutch Ministry of Foreign Affairs.
Sahana Software Foundation	Software Platform Developers	A software development foundation founded to promote the use of open-source software technology for crisis management.
Standby Task Force (SBTF)	Data Aggregator	A global network of volunteers that specialize in open-source data collection and crisis mapping. These activities are done by crowdsourcing problems from the field of humanitarian deployment.
Tech Change	Software Development Platform/ Expert Network	Self-described as a social enterprise, Tech Change provides courses on the use of technology in addressing social and global challenges. It is a registered benefit corporation based in Washington DC.
Translators Without Borders (TWB)	Expert Network	A technology NGO founded in 2010 specializes in translation services to other NGOs such as Doctors Without Borders, Médecins du Monde, and Oxfam. In 2017 they merged with Rosetta Foundation becoming the leading NGO focused on language information management.
Ushahidi	Software/ Platform Development	Self-described as a non-profit technology company, Ushahidi is well known for pioneering the concept of crowdsourcing for social activism. Ushahidi produces software for NGOs and national governments addressing public connectivity and accountability in disasters and conflict regions.
World Pop	Expert Network/ Data Aggregator	A network of professionals that collaborate on world population data and generating census reports through visual software.

Source: Digital Humanitarian Network, 2019

The DHN catalog is the only known attempt to account for DHN's members; therefore, members may have fluctuated between 2015-2017. The table shows that the DHN provided a portal for HROs to articulate their needs and activate assistance from the V&TCs. DHN coordinators would receive a request and determine if it is consistent with the mandate of the DHN and whether it is within DHN's ability to assist. DHN would then contact the V&TC that could best manage the request, or if necessary, compile a solution team of multiple V&TCs (Moore, 2016a). DHN provided HROs with a one-stop-shop for its vast network of experts, professionals, and digital humanitarians, with a range of skills, including social media monitoring, crowdsourcing, crisis mapping, and big data analysis (Verity, 2013). Ultimately, this new dynamic provided HROs the "surge capacity" necessary for managing the explosion of data following a disaster (Global Solutions Network, 2014, p. 13).

3.3. INFORMATION MANAGEMENT IN HUMANITARIAN AID

Information management, or "IM" abbreviated in United Nations vernacular, is a core activity in humanitarian deployments (Verity, Mackinnon, Link, 2014). All the collaboration between the UNOCHA and DHN occurs in the context of information management. While the DHN has been a part of those activities, understanding the challenges of integrating the V&TCs inputs to humanitarian aid requires understanding information management in two dimensions: bureaucracy and process. Specifically, the UN Cluster System bureaucracy impacts the way information is collected, handled, and shared. However, according to several scholars who have studied this, technology has become more public-centric, forcing HROs to adopt technical capacities and methods that they have not been required to use before (Crowley, 2014; Van de Walle, Turoff, and Hiltz, 2014; Comes, Vybornova, and Van de Walle, 2015; Meier, 2015; Verity, 2015). Therefore, there is a hidden interplay between the augmentation of the traditional information management flows in humanitarian aid and the adoption, or lack of, technical capacities that consider 'big data.'

Information management, according to the UNOCHA, is defined in their words as "the responsibility to produce the minimum set of predictable information products to be produced in collaboration with the clusters and made available" (Verity, Mackinnon, and Link, 2014, p. 8; 'Global Humanitarian Assistance Report,' 2014). These products include:

"Contact directories of humanitarian partners and IM focal points; Meeting schedules, agendas and minutes of coordination meetings; Who does What Where (3W) database and derivative products, such as maps; Inventory of relevant documents on the humanitarian situation, i.e., mission reports, assessments, evaluations, et cetera; Inventory of relevant common data

sets, including population data disaggregated by age and sex; Data on the humanitarian requirements and contributions; A country-specific or disaster specific humanitarian web-portal; Situation Reports; and Mapping products" (*ibid*).

The UNOCHA's responsibilities translate information management into desired activities through collaboration rather than a unified process. UNOCHA does not subscribe to a finite interpretation of information management because there is no single framework for it across the UN Cluster System. As stated earlier, the UNOCHA can only encourage cooperation; it cannot compel other HROs to share data or coordinate the information products they create, although most will out of principle. Still, ambiguity has been a persistent element for the HROs as they all have different conceptual frameworks for interpreting information and all implement their competing models (Van de Walle, Van Den Eede, and Muhren, 2008). Past studies done by UNOCHA have concluded with urgent recommendations for establishing a centralized 'Information Management Strategy,' but this has not materialized (Verity, Mackinnon, and Link, 2014).

To compensate for the diversity of actors involved in information management, the UNOCHA suggests standards that allow for datasets and databases to be compatible to support the data that is generally collected by NGOs and nonprofit organizations. So, in practice, UNOCHA consolidates the information management flows of other HROs that, in turn, consolidate information from NGOs and other actors on the ground, all of which have unique collection processes and data formats ("Information Management and the Humanitarian Context," n.d.). UNOCHA also provides standardized analysis based on the clusters' information to create the products they are responsible for producing. In this view, information management is a system of replication that reinforces the mandates of the HROs.

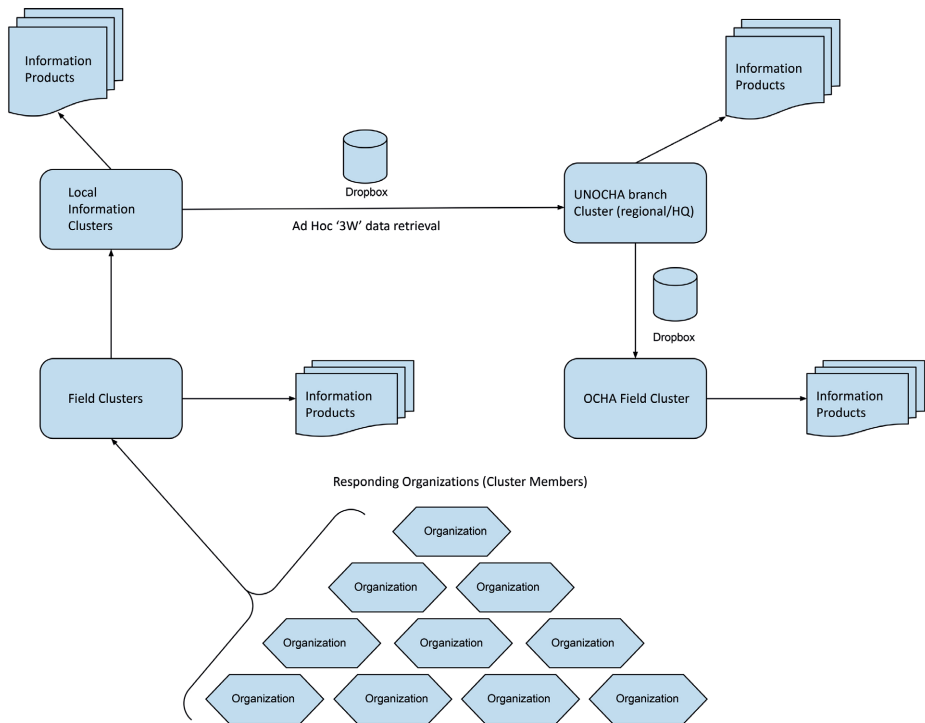
According to Chandler (2015), information management reifies technical advances rather than more fundamental ones related to power and agency (p. 8). In humanitarian aid, the HROs often remain tethered to ingrained policies and procedures based on the era of paper and pen. That is not to say that information management among them is stagnated, as HROs like the World Bank and WHO have poured millions of dollars into newer information systems (Global Solutions Network, 2014). Nevertheless, information management has remained quite complicated at the time of this writing due to the diversity of methods used to collect and make sense of data about a disaster.

Many autonomous actors always control essential information, and these may be working together for the first time (Amin and Goldstein, 2008). Additionally, they may have a vested interest in how information gets reported. For example,

e.g., HROs have specialized assessment units that work alongside local NGOs and governments that will have their frameworks for dealing with information. UNOCHA offices, like the Field Information Service, consolidate the data collected from working groups between the relevant actors in the field and funnel their analysis of that data into information products and services. The information products can then be used to augment the HROs' ability to collect more data and generate collective insights. However, this is a two-way process because UNOCHA is dependent on everyone else for that data collection.

In most cases, UNOCHA will not have the capacity to undertake considerable collection efforts, but they can enter informal partnerships to acquire other actors to do that work. In the context of UNOCHA's mandate as a coordination body, this includes advocacy for inter-agency and multi-sectoral partnerships in information-gathering and analysis tasks (*ibid*). For example, during the hurricane Haiyan response, the UNOCHA created a data flow process that could enable other HROs to report their findings to UNOCHA. Figure 7 illustrates the UNOCHA data flow process for the 2014 response to Hurricane Haiyan. The diagram in Figure 7 shows how information management generally works, with HROs and NGOs collecting information in their ways and then reporting it through 'field clusters' or working groups that compile data in the field for later analysis.

Figure 7: UNOCHA Information Management Process



Source: Verity, Mackinnon, and Link, 2014

In the context of Figure 7, V&TCs became part of the *milieu* of organizations collecting data about a disaster. Their part in collecting and flowing data into information products occurs virtually and always through UNOCHA. Much of their work—including media tracking, geolocation, mapping, data cleaning, translation, and social-networks monitoring—was done by digital volunteers working from their homes and offices worldwide (Meier, 2015). On the other hand, the Digital Humanitarian Network has also never provided a direct definition of information management. They conceptualized their understanding of the term based on the UNOCHA's description and invested much energy into cataloging the capacities of their V&TCs in line with UNOCHA's role in DHN's founding.

The DHN's catalog of V&TCs and their capacities often-included rapid data collection using crowdsourced methods, social media filters to augment traditional assessments, and translation of open-source data from local languages pertinent to a humanitarian deployment into English and French (Global Solutions Network, 2014). As mentioned, one of the 'humanitarian innovations' that HROs have been

looking for has been the activity of crowdsourcing big data in disasters, especially for crisis maps (Gao, Barbier, and Goolsby, 2011).

3.3.1. Integrating Big Data into Information Management Flows

HROs are always under significant pressure to address crises, especially during the first few weeks following a disaster. In the first 72 hours, an initial assessment is collaboratively undertaken by representative teams of the deploying HROs to gauge the scale and severity of the crisis (Steets et al., 2010; IASC, 2015). The assessments must forecast the responses' evolution and locate affected populations that warrant the release of specific aid disbursements (ibid, p. 12). For example, within the first 48 hours of a disaster, UNOCHA utilizes cornerstone information resources—such as the Who does What, Where (3W) database and Relief Web to expedite dedicated information management staff and resources.

These assessments are always done using official channels of communication where information management flows were consolidated via specific 'information products' as illustrated in figure 7. These products are formed in temporary outfits of collaboration that generally operate via four related channels: *within HROs*, *between HROs*, *from individuals to HROs*, and *from HROs to individuals* (Sagun, Bouchlaghem and Anumba, 2009). The challenges of managing information management flow relief differ from those encountered in commercial environments. The need for an urgent response in conditions marked by extreme uncertainty and short operational life cycles represent unique features to humanitarian relief settings (Beamon and Kotleba, 2006; Van Wassenhove, 2006).

The inter-organizational flows of information management across HRO networks are most closely associated with data collection (recording physical damage, needs, vulnerabilities, and capacities); information processing (compiling data into a repository for knowledge management and resource allocation decisions); and information sharing (via a range of platforms, technologies, and structures, whether one-to-one, one-to-many or many-to-one). When these operations are useful, actionable knowledge is created, and consequently, the decision-makers are informed with a granular view of the situation (Day, Junglas, and Silva, 2009).

Alongside these, information officers will form working groups with other counterparts (e.g., NGOs, nonprofits, military) that can be conceived as temporary organizations or systems. They become hubs for human and material resources and information, much like those that generally exist across commercial organizations and forums (Smith and Dowell, 2000). In the case of a humanitarian aid setting, however, it is the disaster that establishes the specific configuration. Therefore, a case can be made that the temporary nature of disaster relief increases the likelihood

that particular forms of information management are needed for them to function efficiently (Day, Junglas, and Silva, 2009).

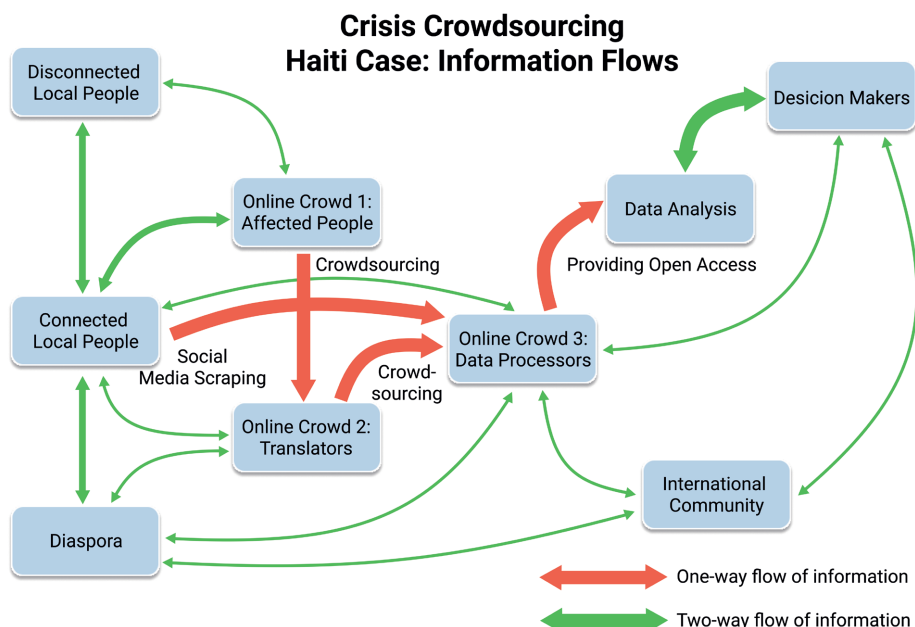
In the immediate aftermath of a natural disaster, new networks of organizations and structures emerge; the supply chains that undergird these networks are hastily established and are not typically comprehensive in scope or range (Altay and Labonte, 2014). This has the effect of prohibiting greater systematization of organizational relationships, including information management flows. Some studies identify information quality (Fisher and Kingma, 2001), timeliness (De Bruijn, 2006), and an unwillingness to share information (Saab et al., 2013), as well as misinterpretation, storage mismatch, and information overload (Meier, 2012) as barriers to humanitarian information management flows. Thus 'humanitarian innovation' has been an encouraging buzzword to signify the desire among humanitarian professionals to automate information management functions, and if at all possible, to find alternatives to the complexity of information management flows in humanitarian aid (Betts and Bloom, 2014).

Although the term 'humanitarian innovation' is rife with confusion and loaded with misunderstandings, senior managers of humanitarian aid understand their information needs in a way that requires them to drive organization-wide innovations from the top-down to solve challenges (Bloom and Faulkner, 2015; Earney and Jimenez, 2019). One of these approaches is improving situational awareness by collecting and analyzing big data via crowdsourcing and linking it to creating information products such as reports or graphics that integrate into the formal decision making of HROs in the field.

The benefits of leveraging big data through crowdsourcing are documented in the literature (see Chapter One). They include near real-time data collection and locational cues of where help is needed in a disaster. Especially, crowdsourcing integrated with crisis maps is a powerful humanitarian assistance tool and disaster relief (Gao and Barbier, 2011). In particular, integrating big data into the HROs' information management flows helps augment the information products that can improve their situational awareness.

V&TCs acted as an aggregating and processing filter to user-generated content, which is no easy task. Only a small proportion of content mined from open-sources is relevant and contains enough information to be mapped (Read, Taithe, Ginty, 2016). The Haiti response was the first case where crowdsourcing was used to picture the affected communities' needs accurately. Figure 8 shows how the information management flows from the local Haitian users traveled and morphed from abstract data posted over Facebook and Twitter (among other platforms) to legible information to HRO decision-makers:

Figure 8: Crowdsourcing in Haiti



Source: Mulder et al., 2016

The information management flows marking the crowdsourcing process in Haiti shows that the information provided by affected people based in Haiti (online crowd #1) flowed to one group of digital volunteers that collected and translated the data, e.g., *Translators Without Borders* (online crowd #2), who converted the data from Creole into English. This is indicated by a large red arrow, indicating the one-way flow of information as translations were only carried out in one direction, from Creole to English, but not vice versa. Then, the translated information flowed from the first group of digital volunteers (online crowd #2) to another group of digital volunteers for analysis, e.g., *StandByTaskForce*, (online crowd #3) in yet another unidirectional flow. Finally, the online crowd #3 converted the translated messages into information products put on a map for HROs to use and include in their reporting (Mulder et al., 2016).

There was some overlap between the three crowds, e.g., some digital volunteers carried out translations and helped with the analysis and mapping data reports. Furthermore, there were pre-existing, personal connections and linkages between members of the different groups. These personal networks enabled two-way flows of information within the crowdsourcing project, as marked by the green

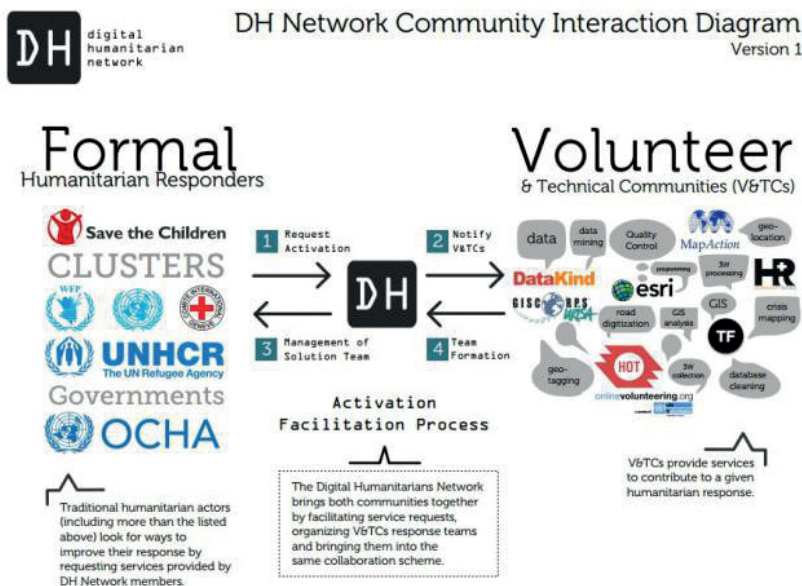
arrows. However, these feedback loops had not been purposefully designed into the crowdsourcing process (ibid).

3.3.2. Coordinating Crowdsourcing Work into Information Products

Producing information products that utilize big data is linked to making data about a disaster legible to the cosmopolitan audience of humanitarian actors; HROs, NGOs, governments, militaries, and other non-profits. The problem of the crowdsourcing capacity and big data, in general, is related to the coordination of the different actors that may be involved in augmenting that data into their information products, e.g., a crisis map or a web-based messaging platform.

As explained earlier, the HROs were often dependent on other actors to help them make sense of people's needs in disasters, especially in the initial stages of a disaster response, which usually spanned between 6 weeks to several months. Therefore, the challenge the HROs and V&TCS faced was how to organically create a reproducible way to manage those processes with actors with little or no formal training or accountability in the humanitarian aid sector. Figure 9 illustrates these two processes, indicating that collaborations needed to be facilitated by the DHN to enable better management of the requested collaboration and its output.

Figure 9: Two-way interaction between HROs (left) and V&TCS (right)



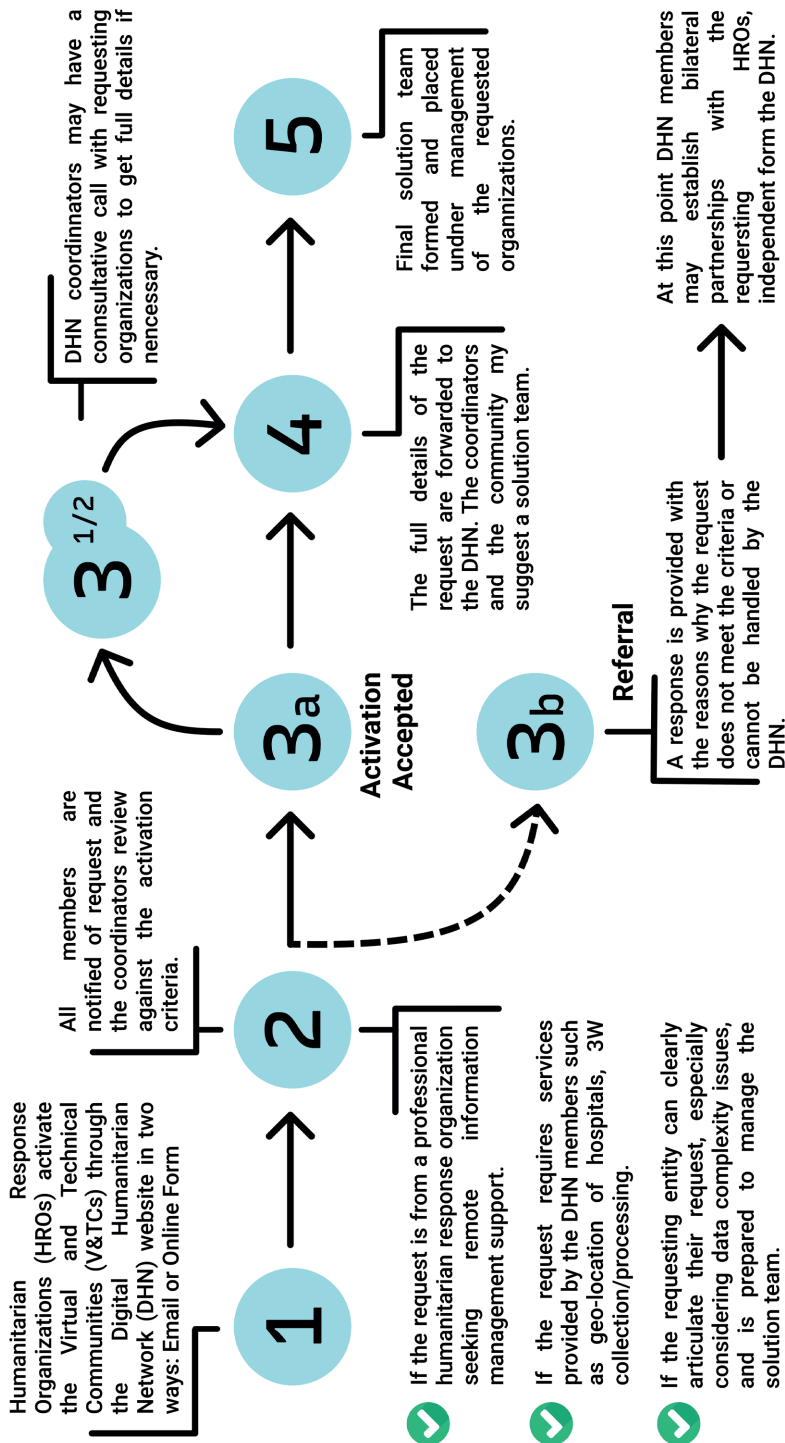
Source: Digital Humanitarian Network, 2014

The management process of internet flows of data is laborious. Traditionally, information passes through reports from one HRO or NGO to another, rather than via a unified virtual network, e.g., the *ReliefWeb* dashboard. Although such platforms exist, the information posted there is voluntarily shared and consumed, and many formal actors have yet to consider these as added values to their operations. In other words, data processing of additional information management flows added volume of the information available. These underpin the modern development of HROs' ability to digest, of which only a few have the means to do so (Kevlihan, DeRouen, and Biglaiser, 2014). Instead, as the figure above shows, HROs enlisted the aid of the V&TCs through the founding of the DHN. Their interactions required a two-way facilitation process to manage what type of V&TC capacity was needed and who would ultimately be responsible for its success.

Many HROs have tried to build their software to improve information flow on the assumption that "if bits of information flow, knowledge will also flow" and become more manageable (Finn and Oreglia, 2016, p.7). This meant that creating information products, e.g., a crisis map or 3W report, are not merely channels of information but snapshots of a disaster painstakingly produced and processed by many actors, including V&TCs. "Information does not just flow out of the categories and classification it is contained in, nor does it jump from one technological platform to another all by itself" (Jensen and Winthereik, 2013, p. 37). As noted by Starbird (2012), the responders to Haiti were neither prepared nor equipped to "produce useful knowledge from the flow of information and data" (p. 10). A vital part of this problem stemmed from the unstructured nature of big data in social media communications and coordinating the work to collect, analyze and process it.

Therefore, converting big data to useful information required both filtering and "re-contextualizing," returning the data to the context of its creation or positioning it correctly within a new context to reconstitute its meaning (Starbird, 2012, p. 5). Big data must be converted into a uniform format that computer programs can process to be collected, filtered, stored, and compared. Nigel Snoad, a former representative of United Nations Disaster Assessment and Coordination (UNDAC), described the problem this way: "If you want to know where the biggest gap is, it is the extraction of structured data from unstructured inputs" (Harvard Humanitarian Initiative, 2011, p. 22). Figure 10 below illustrates the process of leveraging or 'activating' a V&TC via the DHN after a crowdsourcing request from an HRO.

Figure 10: Process of 'activating' a V&TC for Crowdsourcing



Source: DHN, 2014

Relief workers have complained that big data required significant human processing to convert it into the uniform data formats needed for integration with their existing tools and other data sources (Crowley, 2015; Meier, 2015). In Haiti's case, the information flowed through the same channels, contributing to volume and mixing different 'signals' with 'noise' (Starbird, 2012), which means that it was hard to locate the relevant pieces to a given situation with so much information available. Therefore, developing effective filters for separating signal from noise has been cited as dealing with massive data produced and available through computer-mediated communication. This capacity is something that was severely lacking in 2010 and continued to be a challenge well into 2015, and therefore required a process for 'activating' the V&TCs within the formal reporting structures of the HROs to take on the responsibility of managing that extraction (Harvard Humanitarian Initiative, 2011).

As pointed out earlier, social media adds complexity to the information management flows of the HROs in that new filters will not necessarily solve lost context. Information can lose context in different ways during different stages of its lifecycle (e.g., during its creation, its propagation, its aggregation). For example, a Facebook user posting a public status report about an incoming tornado may not bother to mention what city they live in because their message is intended for a specific Facebook social network that would already interpret that message in their context (Starbird and Palen, 2010). Similarly, information propagated on Twitter through the retweet mechanism may lose the reference to the original time it was posted. Therefore, the HROs were challenged to leverage the V&TCs' capacities to structure [big] data generated by disaster-affected communities and turn it into understandable information products that the wider humanitarian aid sector could share and use.

3.4. SUMMARY

The chapter introduced and distinguished the HROs and V&TCs and clarified their roles in humanitarian aid. We began introducing the UN Cluster System, a network of HROs that we distinguish from NGOs due to their mandates' legality for humanitarian deployment. Among these, the UNOCHA services a coordination role, but it is also heavily engaged in advocacy for the modernization of humanitarian aid, which it calls 'humanitarian innovation.' There are many dimensions to this goal, but we focus on incorporating big data collected via social media into the information management processes of the HROs. Since the HROs did not possess the capacity to make sense of big data, they relied on UNOCHA and DHN to manage those capacities supporting their roles. The next chapter will discuss the epistemological approach to the research and the data collection and analysis processes used to interpret the findings.

4

EPISTEMOLOGY

"Method is not (...) a successful set of procedures for reporting on a given reality. Rather it is performative. It helps produce realities". — John Law (2004, p.143).

The chapter will cover the overarching epistemology that considers social constructionism, a theory that examines the development of jointly constructed understandings of the world (Gamson et al., 1992). The social-constructionist epistemology is an interpretive approach to the study, which means that the data constituted the insights of people who have personally facilitated the collaborations between HROs and V&TCs or are the subject matter experts thereof. This manuscript acknowledges these valuable data in keeping with qualitative traditions and will use them and their supporting literature to derive facts about the case study. Furthermore, concerning these, the chapter will explain how the case study was organized, the researcher's role in his fieldwork, and the methods used to make sense of interviews and literature: *narrative analysis* and *thematic coding*. Both are classic qualitative tools used in the analysis of the data before being treated by the CGM.

The *narrative analysis* uses field texts, such as field notes, letters, conversations, interviews, personal stories, life experiences, or other qualitative artifacts as the units of analysis. This helps understand how people create meaning in their narratives about a subject (Clandinin and Connelly, 2000). *Thematic coding* is another form of analysis that helped organize and interpret patterns of meaning or 'themes' within qualitative data (De Santis and Ugarriza, 2000). This coding method was used alongside a *narrative analysis* in the manual work to derive meaning from the data through treatment processes. The chapter will cover these and the researcher's engagement in the empirical environment, and the methodological connection with the CGM.

4.1. INTRODUCTION: OVERARCHING EPISTEMOLOGY

The theoretical perspective herein takes an interpretive approach and social constructionism: the idea that reality is not absolute but accessible through the study participants' interpretations of a phenomenon (Gergen, 1992). Therefore, the researcher chose an interpretive perspective to view the theoretical construction of collaboration among the HROs and V&TCs. As Rosen (1991, op cit., Orlikowski and Baroudi, 1991) stated, "interpretivism is a philosophy that believes that understanding a thing involves getting inside the world of those who generate it" (p. 19). In practice, this meant that the researcher studied the study participants' interpretations relative to their social construction of collaboration between HROs and V&TCs.

The reality of how collaboration is engendered between HROs and V&TCs is discovered in human generalizations about the experience. The production of such knowledge does not happen in a vacuum but in the context in which their sense of reality is constructed (Gergen, 1992). To get a better sense of the overarching

epistemology, we provide an overview of social-constructionism and what it means for this study's theoretical considerations.

Epistemology-Social Constructionism: The conceptualization of how human beings make sense of the world subsumes a specific knowledge theory. This implies that individuals in their conceptualizations construct reality, which means that 'discovering' reality as an objective truth is 'constructed' through people's activities. As noted by Walsham (1995), Geertz (1973) suggested that researchers operate a double construction when dealing in the interpretations of others: "What we call 'data' is our construction of other people's constructions of what they and their compatriots are up to" (p. 9, op cit., Walsham, 1995, p. 75). Crotty's (1998) definition of constructionism also supports Walsham (ibid) similarly stated that "Constructionism is the view that all knowledge and meaningful reality is constructed from the interactions between human beings and developed within an essentially social context" (p. 46). This definition subsumes two fundamental tenets:

Firstly, knowledge does not unfold by discovering an objective reality but through human constructions of reality (Myers and Avison, 2002).

Secondly, social constructionism articulates how people produce their concepts does not develop in a vacuum but is built in the 'social context' in which individuals are immersed (Crotty, 1998, p. 55):

A similar point is made by Hacking and Hacking (1999). They stated that all human constructions are developed through social interactions in which reality is seen and constructed by the *social milieu* to which individuals belong. In other words, the researcher needed to order the individual interpretations of the HROs and V&TCs through the social constructions of their collaborations. According to Whitehead (2005), social constructions study cultural systems defined as a holistic, flexible, and non-constant set of relations with continuities between their interrelated components. For instance, the interactions between the HROs and V&TCs were grown from their shared patterns of collaboration shared by the UNOCHA and DHN coordinators who facilitated their coming together.

The social constructionist position is typical for this kind of work and supports a transactional method of inquiry, where the researcher has a personal interaction with the study's actors (Whitehead, 1995). As a design, the case study is defined by individual narratives' interest (Merriam, 2009). The researcher adopted a qualitative case study because it focuses on probing for themes among the HROs and V&TCs from the people who coordinated collaboration, e.g., UNOCHA/DHN staff.

According to Baxter and Jack (2008), a case study is a common approach for understanding an activity's totality through small examples, especially considering our epistemological approach to fact-finding. In other words, the researcher used the qualitative approach to generate insights into the working order of collaboration between HROs and V&TCs as expressed through a variety of qualitative data. The case study approach "explores a real-life, bounded system [a case] through multiple sources of information that report on the 'backstage' environment of a phenomenon (Creswell, 2013, p. 97). The motivation for a case study originated from previous work: "Handbook on Networks in Innovation and Crisis Management: Theory and Practice in a Dynamic and Disruptive Environment" (Ortt, Bücken & Klein, 2016) as well as other publications (cf. Sabou and Klein, 2016; Sabou and Vidolov, 2016; Sabou, Noori and Husch, 2015).

The case study followed the initial successes of the UNOCHA and DHN as the basis for exploring the relationship between HROs and V&TCs. The case study approach was appropriate for generating insights through the epistemology of social constructionism. It helped "explore a real-life, bounded system through detailed observation involving multiple sources of information" (Creswell, 2013, p. 97). According to Emerson, Fretz, and Shaw (2010), the case study "establishes a place in some natural setting on a longitudinal basis in order to investigate experiences and represent social life and processes that occur there" (p. 352). It is also argued that all research wittingly or unwittingly involves people, a set of circumstances, and a series of decisions that require peeling away layers of organizational life (MacDonald, 2012).

4.2. DATA COLLECTION AND FIELDWORK

The data collected consisted of primary and secondary data sources: face to face interviews, web-blogs, UNOCHA/DHN guidance documents, scholarly publications, and transcribed discussions that offered insights into the collaborative practicalities between the HROs and V&TCs. These included DHN supervisory board discussions, UNOCHA situation reports, guidance documents, and the researchers' observations where applicable. The latter originated from a study conducted by representatives of UNOCHA who were seeking to understand the difficulties of integrating V&TCs into their operations. These secondary interviews were conducted in 2013, and the researcher between 2015-2017 conducted the primary interviews. These highlights our longitudinal engagement with the UNOCHA and DHN, respectively.

The primary data collection focused on interviewing UNOCHA information officers and their DHN counterparts. The researcher interviewed participants regarding their views on the integration of V&TCs and their information management processes. Multiple audio recordings, transcripts, field notes, and project documentation

formed an iterative analysis that focused on trust, governance, and stability of the collaborative relationship between UNOCHA and DHN. These were supplemented with text data from action reports, think-briefs, guidance materials, personal correspondence, internal reports, and other publications.

The researcher initially had a set of assumptions around which it was difficult to frame specific questions. Therefore, much of the initial inquiry period involved the researcher always being alert when something emerged either in the FIS team's daily routines or informally. In such situations, the researcher asked intuitive questions and kept notes to further explore an issue with interest, having inserted the appropriate natural queries of *what, how, who, where, when, and why*. These were complemented by more specific questions that operationalized a given topic's socially constructed reality (Denison, 1996).

On the other hand, every ethnographer also experiences unusual events—some periodic, others unpredictable, and aperiodic (e.g., deployment to a disaster or crisis). Thus, in actual collaboration cases, the researcher mainly engaged in activities typically organized by the DHN and conducted by the V&TCs. For instance, collecting big data or 'data cleaning' into a format could be integrated into a map and understood by humanitarian professionals. Alternatively, being present at meetings involving UNOCHA and DHN coordinators via Slack or Skype and recording their meeting minutes. These included observing the FIS team meetings, shadowing staff in their daily routines, participating in information management projects, and being on call to support UNOCHA deployments with mundane tasks.

The researcher took on an ethnographer's role, whereby the researcher integrated into the Field Information Service or 'FIS' Branch at UNOCHA. While there, the researcher engaged in day-to-day routines and generally observed the UN staff's familiar environment. The researcher participated in multiple FIS activities, such as taking part in the assembly of staff rosters, and observed the development of an organizational check-in system—*Humanitarian ID*. Much of the initial inquiry period involved the researcher engaging in the FIS team's daily routines or informally participating in gatherings. In such situations, the researcher asked intuitive questions to further explore topics of interest: e.g., *who, what, when, where, and why* questions. These were complemented by more specific questions that operationalized the constructed reality (ibid).

The study participants' retelling of their collaborative experiences was recorded through audio-taped interview sessions, informal conversations, and verbatim notes as opportunities allowed. Data collection is always data construction (Wolcott, 1994; Jackson and Mazzei, 2011). That meant constructing a sketch of

the collaborative relationship between HROs and V&TCs as operationalized by their representative coordinator organizations: the UNOCHA and the DHN.

According to Taylor and Bogdan (1984, p. 15), such studies require the researcher to participate in their *social milieu*. Thus, the researcher's proximity to the information officers at FIS offered several advantages and access. The researcher also gained access to the DHN and their core team of coordinators gleaned into the DHN. This kind of extrapolated networking is common among ethnographers in their social settings study (De Munck and Sobo, 1998).

As previously stated, the researcher constructed his interpretation of his interviewees' socially derived reality through their narratives. He also participated in generic FIS activities, such as taking part in the assembly of staff rosters and developing an organizational check-in system—the Humanitarian ID. Such activities helped build rapport and trust for access to more contextual insights to guide the data collection. For example, Van Schaik (1992) noted issues among community health aides in rural Jamaica that she did not understand her study participants' concerns until she began traveling with them on local buses and observed their constraints mobility.

According to Taylor and Bogdan (1984), such studies involve the researcher immersing himself among the participants in their *social milieu*. In other words, spending time with the UNOCHA's FIS branch allowed for the *narrative analysis* of patterns understood by the interviewees' narratives during their collaborations. This is common among ethnographers in their social settings study (De Munck and Sobo, 1998).

4.2.1. Semi-structured Interviews

The interviews, which make up the core of the study's insights, were organized using a questionnaire that involved gauging and probing for the normative problems and perceptions within the UNOCHA and the DHN. Each session was approximately one hour in length (some were given longer based on their willingness to speak and availability) to allow in-depth responses. Each interview was audio-recorded, transcribed, and thematically coded and analyzed. The researcher utilized a general interview guide format, which was oriented around semi-structured interviews (see appendix II). Themes were analyzed following the CGM. Semi-structured/structured interviewing was an iterative process, so a list of the events and situations that the researcher observed often changed quickly. What is observed in a setting will also be shaped by the observer's interests (Agar, 1996; Wolcott, 1999). In general, there were two operational cycles of data collection concerning interviews:

First Interview Cycle: The purpose of the first interview cycle was to establish inductive themes connected to the study's research questions. These inductive themes helped guide questions for the second cycle of interviews with select participants.

Second Interview (follow-up) Cycle: Following the second interview cycle (see Appendix II), interview responses were coded and thematically organized.

Setting: Interviews were conducted individually so that information, responses, and observations would occur in isolation from other insights. These would then be codified and compared to generate analytical insights and generalizability. The start of each interview included a five-minute briefing period allowing for a review of the study's purpose, using the audio recording device, and providing an opportunity for the interviewee to ask questions or voice concerns. According to Kvale and Brinkman (2009), this kind of pre-interview prep is typical in most qualitative interview formats.

The researcher's approach to the interview process entailed probing for the context and meaning of the interviewee's responses to questions. This approach formed the most frequent fact-finding composition, and it is the most common interviewing technique used by ethnographers (Campbell et al., 2013; Spradley, 2016). Therefore, the method of questioning was organized in succession during one-hour-long sessions. An interview protocol was also created to mechanistically probe between generalizable questions and more technically specific ones about the phenomenon. The researcher interviewed 36 interviews in total. These are represented in the table below.

Table 3: Primary Interviews

Interviewee	Position	Organization	Date Interviewed
1. Andrej Verity	Lead Manager	UNOCHA	Nov. 3, 2015/ Dec. 9, 2016
2. Yaelle Link	Information Officer	UNOCHA	Nov. 4th, 2015
3. Richard Tyson	Special Projects Officer	UNOCHA	Nov. 16th, 2015
4. Eric Kaslander	Information Officer	UNOCHA	Nov. 17th, 2015
5. Janet O'Callaghan	Information Officer	UNOCHA	Nov. 24, 2015
6. Chad Hendricks	Information Officer	UNOCHA	Nov. 26th, 2015
7. Patrick Hernusi	Information Officer	UNOCHA	Nov. 29th, 2015

Table 3: Primary Interviews (continued)

Interviewee	Position	Organization	Date Interviewed
8. Willow Brugh	Former Coordinator	DHN-Harvard University	Aug. 11th, 2015
9. Roxanne Moore	Digital Coordinator	UNOCHA-DHN	Aug. 20th, 2015/ Dec. 9th, 2016
10. Heather Leson	Digital Coordinator	DHN-QCRI	Oct. 18th, 2015
11. Heather Milton	Digital Coordinator	DHN-GISCorps	Oct. 20th, 2015
12. David Black	Programme Manager	DHN/Crisis Commons	Nov. 10th, 2015
13. Helen Campbell	Digital Coordinator	DHN-Nethope	Nov. 11th, 2015
14. Kenny Meesters	Product Developer	Standby Task Force	Nov. 13th, 2015
15. Ajay Kumar	Product Developer	Standby Task Force	Nov. 16th, 2015
16. Kate Chapman	Former Director of Operations	Humanitarian OpenStreetMap Team	Nov. 17th, 2015
17. Neil Horning	Digital Coordinator	QuakeMap/DHN	Nov. 19th, 2015
18. Lars Nissen	Project Lead/Director	Assessment Capaities Project (ACAPS)	Dec. 4th, 2015
19. Patrick Meier	Founder	DHN-WeRobotics	Jan. 21, 2016
20. Andrea Tapia	Social Scientist	Pennsylvania State University	Aug. 15th, 2015
21. Tiernan Doyle	Project Coordinator	BoCo Strong	Nov. 18th, 2015
22. Sarah Vieweg	Social Scientist	Qatar Computing Research Institute	Nov. 3rd, 2015
23. Lars Nissen	Project Lead/Director	DHN-ACAPS	Dec. 4th, 2015
24. Liz Hughes	Project Manager	MapAction	Dec. 9th, 2016
25. Luis Capelo	Programme Manager	FlowMinder	Dec. 12th, 2016
26. Liz Hughes	Project Manager	MapAction	Dec. 9th, 2016
27. Patrick Meier	Founder	DHN-WeRobotics	Jan. 21, 2016
28. Maarten van der Veen	Information Officer	International Red Cross	Jan. 28th, 2017
29. Simone Alzari	Information Officer	World Food Programe	Jan. 19th, 2017

Table 3: Primary Interviews (continued)

Interviewee	Position	Organization	Date Interviewed
30. Abdihamad Warsame	Programme Manager	Save the Children	Jan. 26th, 2017
31. Simone Alzari	Information Officer	World Food Programme	Jan. 19th, 2017
32. Olivier LePolain	Information Officer	Save the Children Foundation	Jan. 27th, 2017
33. Emma Diggle	Director	Save the Children Foundation	Jan. 27th, 2017
34. Gavin Wood	Information Officer	UNICEF	Feb. 18th, 2017
35. Patrice Chaitagner	Programme Director	Assessment Capacities Project (ACAPS)	Feb. 19th, 2017
36. Per Aarvik	President	DHN	Nov. 20, 2017

The interviewees were drawn from a diverse group of humanitarian professionals and digital volunteers that had participated in the responses to humanitarian crises, e.g., Haiti Earthquake (2010), the Ebola epidemic (2014), Vanuatu Typhoon (2015), the Nepal Earthquake (2015). Two collaborations were 'activated' during the data collection phase: Once in October 2015 during an earthquake in northern Pakistan and again in late November 2015 following floods in Bangladesh. In both cases, the UNOCHA worked with DHN to leverage V&TCs to support deployed HROs with crowdsourced Twitter feeds to map infrastructure damage. The researcher also arrived late into the highly publicized Nepal earthquake response, which gave a view of how HROs and V&TCs mediated their collaborations.

Essentially, the researcher moved from collecting generalizable information to more focused data as the interviews progressed. Each interviewee had approximately one hour per interview with exceptions in cases where interviewees wanted to deep-dive into their experiences, e.g., Neil Horning from Quake Map Team/DHN regarding his experience working with Kathmandu Living Labs in the 2015 Nepal earthquake. Spradley (1979) recognizes this kind of preparation accordingly: (1) *example questions*, (2) *experience questions*, and (3) *native language questions* (see Appendix II). These also enabled a more in-depth probe into the socially constructed reality of what collaboration entailed. The number of interviews conducted was once per participant. However, some were invited for a second interview depending on their initial contribution. For instance, Andrej Verity, Roxanne Moore, and Heather Leson were interviewed twice.

4.2.2. Secondary data sources

As mentioned, the interviews were also supported with literature data that included artifacts produced by the UNOCHA and the DHN. In most cases, these were published documents available open-source; via the UNOCHA's or DHN's web portal. Other materials were also found via ReliefWeb.org, a web-based dashboard concerning trends in 'humanitarian innovation,' e.g., collaborative guidance documents and data formatting standardization. ReliefWeb.org was created with the support of the UNOCHA to support technical advocacy and generate interest among the HROs in newer forms of information collection and analysis.

The researcher also used weblogs produced by Andrej Verity, Patrick Meier, and John Crowley and available publications in scientific databases, e.g., Web of Science, ProQuest, and Google Scholar. Additional knowledge was consolidated from the Digital Humanitarian Network's web-portal, where contextual information has been made available in the form of publications and archived reports detailing the collaborations and their guidelines. The supporting material was collected during and after the interview data collection process. These artifacts were selected based on ongoing trends in the collaborative relationship between the HROs and V&TCs and were manually triangulated with the interviews.

The second set of interviews provided additional information regarding the HROs and V&TCs in the earliest stages of their collaborations, dating to 2013. Although the researcher did not interview these individuals himself, he was allowed access to their transcripts to compare them with the first set of interview responses. These allowed for a longitudinal view of their collaborations over a few years (2013-2016). The second interview chart is categorized as secondary source material as it was made-available by Simeon Vidolov, Ph.D., and conducted by Annie P. Waldman, MS.

Table 4: Secondary Interviews

Interviewee	Position	Organization	Date Interviewed
Cat Graham	Co-Founder/ Chief Operations Officer	Humanity Road	3 June 2013
Heather Leson	Project Leader	Ushahidi	11 June 2013
Kate Chapman	Executive Director	Humanitarian OpenStreetMap Team	11 June 2013
Luis Capelo	Coordinator	Digital Humanitarian Network	10 June 2013
Minu Limbu	Innovation Manager	United Nations Children's Fund	10 June 2013
Natalie Chang	R&D Manager	Internews	10 June 2013
Patrick Meier	Co-Founder	Digital Humanitarian Network	
Ryan Burns	Assistant Professor	University of Washington	9 June 2013
Sanjana Hattotuwa	Special Advisor	ICT For Peace Foundation	11 June 2013
Severin Menard	GIS Freelancer	Humanitarian OpenStreetMap Team	9 June 2013
Shoreh Elhami	Co-Founder	GIS Corps	10 June 2013
Chris Albon	Director/Data Projects	Ushahidi	11 June 2013
Cathy Furlong	Former President	Statistics Without Borders	11 June 2013
Sandra Sudhoff	Technical Director	CartONG	10 June 2013

Attention was given to the experiences of collaboration between HROs and V&TCs, as recalled by the interviewees. The researcher also facilitated an ethnographer's role, whereby the researcher integrated into the Field Information Service or 'FIS' Branch at UNOCHA. While there, the researcher engaged in the day-to-day activities and generally observed UN information officers' environment. Although the researcher's observations will feature in some parts of the analysis, these are not considered prominently because they only touched on the researcher's activities. e.g., daily routines and minor works such as 'data cleaning.' This entailed the manual processing of V&TC collected [big] data into Excel sheets or other formats understandable to humanitarian professionals. The researcher also maintained notes and minutes during Skype or Slack meetings between the FIS and personnel working in field basecamps. As with the observations, these do not feature prominently in the analysis as they offered little insight into the actual process of collaboration between HROs and V&TCs.

4.3. ANALYZING THE DATA

Ansell and Gash's (2008) Collaborative Governance model (CGM) was used for scaffolding the key themes that emerged from the interviews and supporting materials. The analysis happened concurrently with the data collection, and at the time, the CGM had not yet been selected as the theoretical lens. It is common for data collection and initial analysis to occur before the application of an appropriate model. The data analysis significantly overlapped with the data collection and formed iterative cycles between these two processes (Walsham, 1995). Following an abductive approach (Golden-Biddle and Locke, 2006), the analysis started with the puzzle of understanding the collaboration difficulties between HROs and V&TCs.

After trying to make sense of the data drawing on the extant perspectives in crisis management, the researcher turned to the CGM and used it as a sensitizing device (Starman, 2013). This worked similar to how a detective might reconstruct reality out of the different plots told by witnesses (Czarniawska, 1999). The CGM was selected after most of the data had already been collected, and therefore operationalizing the analysis took on three distinct phases:

(1) The initial interviews were transcribed and analyzed utilizing the *narrative analysis* to search for patterns and emergent themes from the text. (2) The themes were written down in field notes and categorized manually using *thematic coding*. (3) The themes that emerged from the data were then matched with the CGM categories to their best approximation. The third process was essentially triangulating the patterns derived from the interviews and literature with themes that fit the model.

The data analysis significantly overlapped with the data collection and formed iterative cycles between these two processes (Walsham, 1995). Following an abductive approach (Golden-Biddle and Locke, 2006), the analysis started with the puzzle of understanding the collaboration difficulties between HROs and V&TCs. After trying to make sense of the data drawing on the extant perspectives in crisis management, the researcher turned to the CGM and used it as a sensitizing device. This worked similar to how a detective might reconstruct reality out of the different plots told by witnesses (Czarniawska, 1999).

While the actual organization of the insights dealt with *narrative analysis*, these were triangulated with text data from action reports, think-briefs, guidance materials, personal correspondence, and internal reports and publications. The narrative analysis involved comparing the themes emerging from the CGM's Collaborative Process data and synthesized them with substantive *thematic coding*.

4.3.1. Narrative Analysis

Narrative analysis is a classic research approach (Reissman, 1993) to qualitative data. The researcher analyzed the stories people created, engaging in asking a question according to a narrative ‘text,’ in our case, the interview protocol. The narrative analysis helped the researcher understand how the interviewees represent themselves, their experiences, and their counterparts, e.g., how UNOCHA information officers viewed their DHN coordinators in the Collaborative Process. The approach of social constructionism supports this. Labov (1972) also defined a narrative as “one method of recapitulating experience by matching a verbal sequence of clauses to the sequence of events in which they occurred” (pg. 369). Labov (1972) “a narrative passage ... is a sequence of at least two clauses which are temporally ordered. The skeleton of a narrative consists of a series of temporally ordered clauses” [called narrative clauses] (p. 361). So, for example:

(a) “The team that I am leading is identifying, allocating, and collecting information.

(b) “I have access to decision-makers in the field and their needs.”

(c) Technology is enabling the use of cloud or online tools, but their predictability is the key issue.”

(A. Verity, personal communication, 5 November 2015).

In this passage, only clauses a and c are narrative clauses. Clause b is not because, in Labov’s terminology, a clause with no temporal component can be moved freely up and down in the text without altering its meaning. A rearrangement of narrative clauses, however, results in a change in meaning (“I have access to decision-makers and they are worried about tech predictability” vs. “Technology enables cloud or online tools, but these are unpredictable for decision-makers”).

In the breakdown of narrative passages, there is a distinction between narrative and non-narrative clauses. The presence of six distinct functional parts in a fully formed narrative include: (a) abstract; (b) orientation; (c) complicating action; (d) evaluation; (e) result or resolution; (f) coda. (Labov, 1972, pg. 370). However, in a sequence of events presented in a narrative passage, not all events are equally consequential for a changed situation. These are basically “motifs [actions and events] which change the situation, whereas those which do not are static” (Tomashevsky, 1965, p. 70). This distinction—between those actions and events that fundamentally alter a narrative situation and those that do not—often recurs in the field.

Narrative analysis was applied broadly in order to label the differences among interviewees or authors of supporting literature. It helped the researcher make

sense of individuals and their organizations' views within the context of a temporal succession of collaborative experiences. In our case, these events were the humanitarian deployments to major disasters and the requested or brokered collaborations between HROs and V&TCs that occurred amidst the pressures of that temporal environment. The process of analyzing these texts was done manually alongside thematic coding, which accounts for Labov's (ibid) point (f) coda.

4.3.2. Thematic coding

Thematic coding was used to manually organize fragmented data in the interpretation service carried out with *narrative analysis*. Thematic coding was best suited to elucidating the specific nature of a given group's conceptualization of the phenomenon under study (Glaser and Strauss, 1967; Strauss, 1987; Corbin and Strauss, 2008). There are various approaches to conducting thematic coding, but the most common form follows a six-step process: (1) Familiarization, (2) Coding, (3) Generating themes, (4) Reviewing themes, (5) Defining and naming themes, (6) Writing up. This process was initially developed for psychology research by Braun and Clarke (2006). Table 5 offers a breakdown of the thematic coding process into six phases that occurred before attributing the text's context to their CGM variable.

Table 5: Phases of Thematic Coding

Phase	Process	Result	Reflexivity Entries
Phase 1	Read and re-read data to become familiar with what the data entails, paying specific attention to patterns that occur.	Preliminary “start” codes and detailed notes.	List start codes in the coding scheme and describe what each code means and its source.
Phase 2	Generate the initial codes by documenting where and how patterns occur. This happens through data reduction, where the researcher collapses data into labels to create categories for more efficient analysis. Data complication is also completed here. This involves the researcher making inferences about what the codes mean.	Comprehensive codes of how data answers the research question.	Provide detailed information on how and why codes were combined, what questions the researcher is asking of the data, and how codes are related.
Phase 3	Combine codes into overarching themes that accurately depict the data. It is important in developing themes that the researcher describes exactly what the themes mean, even if the theme does not seem to “fit.” The researcher should also describe what is missing from the analysis.	List of candidate themes for further analysis.	Note how the codes were interpreted and combined to form themes.
Phase 4	In this stage, the researcher looks at how the themes support the data and the overarching theoretical perspective. If the analysis seems incomplete, the researcher goes back into the data to find what is missing.	Coherent recognition of how themes are patterned to tell an accurate story about the data.	Notes need to include the process of understanding themes and how they fit together with the given codes. Answers to the research questions and data-driven questions need to be abundantly complex and well-supported by the data.
Phase 5	The researcher needs to define what each theme is, which aspects of data are being captured, and what is interesting about the themes.	A comprehensive analysis of what the themes contribute to understanding the data.	The researcher should describe each theme within a few sentences.
Phase 6	When the researchers write the report, they must decide which themes make meaningful contributions to understanding what is going on within the data. Researchers should also conduct member checking. This is where the researcher goes back to the sample at hand to see if their description is an accurate representation.	A detailed description of the results.	Note why particular themes are more useful at making contributions and understanding what is going on within the data set. Describe the process of choosing how the results would be reported.

Source: Braun & Clarke, 2006

In the review of each interview participant's transcript, the words and sentences that conveyed similar meanings were identified and labeled with codes (Graneheim and Lundman, 2004). The coding process allowed for the interpretation of large segments of text and portions of information linked to identifying common themes. For instance, multiple readings of audio recordings, transcripts, field notes, and project documentation focused on themes of trust, governance, and stability of the collaborative relationship. The researcher initially struggled to attach codes to various sections of text represented in the meaning units. There seemed to be endless choices of words to characterize the experiences that interviewees described. Therefore, the characterizations resulted in the creation of a large number of codes.

Although computer-assisted programs are popular for processing large amounts of qualitative data, trying to learn the principles of coding and qualitative data analysis while also becoming competent at navigating, such software functions proved difficult and too time-consuming. Therefore, the researcher decided to manually code the data using Microsoft Word to segment each transcript into sections and margins while also adding codes in the margins and color-coding the text according to the emergent themes (more on this in the next sub-section).

After reviewing the literature on proper coding procedures, the researcher decided to structure his coding by labeling narrative passages according to the research questions (Saldaña, 2009; Campbell et al., 2013; Belotto, 2018). For example, common themes that appeared from the interview transcripts and guidance documents often dealt with co-occurrent words such as 'Protocols,' 'Standards,' 'Roles,' 'Grassroots,' 'Context' and 'Impact.' Thus, the researcher used labels for codes such as 'Governance,' 'Technical Expertise,' 'Management' to classify narrative passages from the text. As the researcher studied each interviewee's transcript, he also developed a code list (see Appendix I). The codebook listed all the codes used for each participant's transcript; thereby, documenting exactly how every text passage was evaluated. The code list continually grew as subsequent participants discussed new topics, requiring additional codes.

For some narratives, a secondary label was also attributed to groupings of challenges in the Collaborative Process, such as the proper representation of interests, working under time-pressures, or the psychological challenges of coping with heavy workloads. The researcher utilized a descriptive coding method to create labels that conveyed the essence of what he heard in each narrative passage, paying attention to cross-cutting labels. This method significantly reduced the number of codes that the researcher started with initially and provided a context to create categories of codes or code families. The approach also addressed some of the challenges resulting from the open-ended questioning used in qualitative research.

Participants may provide lengthy and complicated responses, digress, or discuss multiple themes (Campbell et al., 2013).

4.3.3. Methods interaction with the CGM

Ansell and Gash's (2008) Collaborative Governance model (CGM) was used for scaffolding the emergent themes from the interviews and supporting material, while the actual organization of the insights dealt with narrative analysis to pick apart what was described behind the scenes of a collaboration. Common themes from the interviews dealt with mundane themes such as 'data formatting' and 'product relevance,' attributed to a code such as 'Technical Expertise.' These were then correlated to the appropriate CGM variable and matched with the emergent themes in the interviews. In this way, the CGM variables' preconceived notions were codified with the key themes that emerged from the interviews. Table 6 offers the coding classifications according to theme and variable.

Table 6: Turning variables into themes and themes into codes

CGM Variables	Thematic Key Words	Code
Institutional design	Organizational structure, Bureaucracy, Standards	Governance
Starting conditions	Protocols, Field logistics, Roles, Stakeholders	Governance, Management
Power & knowledge asymmetries	Contextual Info., Politics, Donors, Grassroots design	Technical Expertise, Governance
Incentives/deterrents to collaboration	Risk, Information Security, Impact, Credibility	Governance, Management
Pressures and influences	Coordination, Problem owner, Grassroots design, Donors	Governance
Prehistory of cooperation or conflict	Disruptive Innovation, Tacit knowledge, Capacity retention	Management
Facilitative leadership	Coordination, Volunteer management, Interface, Recruiting, Matchmaking	Collaboration, Management
Collaborative Process	Ad-hoc, Sustainable learning, Matchmaking, Impact, Protocols, Training/Awareness	Collaboration
Building trust	Interface, Boundary spanning, Credibility	Collaboration
Commitment to the process	Ad-hoc, Roles, Independence, Sustainable learning	Management

Table 6: Turning variables into themes and themes into codes (continued)

CGM Variables	Thematic Key Words	Code
Mutual recognition of interdependence	Ad-hoc, Decision making,	Collaboration
Shared ownership	Roles, Responsibilities	Management
Defining a clear mission	Roles, Responsibilities, Credibility, Coordination	Governance, Collaboration
Common Problem Definition	Problem owner, Impact, Product relevance, expertise	Collaboration, Technical Expertise
Identification of common values	Training/Awareness, Tacit knowledge,	Collaboration, Innovation
Intermediate outcome	Resilience building, training, awareness, outsourcing	Management
Small wins	Data standardization, Data protectionism, Information Security, IM Product	Technical Expertise
Strategic plans	Community resilience, Training/Awareness, Deployable Teams	Innovation
Joint-fact-finding	Coordination, matchmaking, Big data, Data relevance, Bias	Collaboration, Technical Expertise
Collaborative Outcome	ICT support, Sustainable Learning, Recruiting	Innovation

In the coding process, the researcher articulated the interviewees' responses by concentrating on the "content of the interviews as the exclusive focus" of the research (Riessman, 2008, p. 53). After familiarizing himself with the key themes and matching them to the appropriate variable in the CGM, the researcher coded each line of transcribed text manually and attached classifications according to the themes that emerged. Secondary sources, such as weblogs from the interviewees (e.g., Andrej Verity's blog *VerityThink*), were also treated. Coding meant highlighting sections of the text—usually phrases or sentences—and coming up with shorthand labels or 'codes' to describe their content. For example, perceptions of Commitment to the Process were matched with the code 'Management' as this reflected the closest to the emergent theme that had been generated. An extract from one coded interview looks like this:

Table 7: Example of Coding Process

Interview extract	Codes
Many agencies have relatively few geographic information system (GIS) professionals, and many don't realize their full potential" [Highlighted in yellow for technical related Theme] ...	Technical Expertise
... "As a result, redundant operations take place because there is very little communication or knowledge of existing capacities" [Highlighted in turquoise for Collaboration related theme].	Collaboration CGM variables this text could belong to according to table 1: Common Problem Definition

This text belongs to the code group for 'Technical Expertise,' as it describes competence that does not fully exist within HROs. However, the text also reveals elements about the code group for 'Collaboration' since the latter portion of the text describes a lack of knowledge and communication regarding GIS capabilities considering existing operational redundancies. Therefore, the text is split between color codes and sorted according to thematic context. The text would then be correlated to the appropriate CGM variable that served this coding structure to categorize the interviewees' responses concerning the model.

4.3. LIMITATIONS OF THE DATA

It is important to note that the data is unfortunately not exhaustive for two reasons.

1. The study covers a micro-level examination of the problem because the collaborations occurred under particular conditions and contexts. This meant that HROs and V&TCs only came together after an official request by the HROs and usually within the first 72 hours of organizations' humanitarian deployment.
2. Only seventeen of the thirty-three interviews are presented in the next chapter with elements about how V&TCs engage in digital volunteer work during a humanitarian deployment. In contrast, others expressed more technical and bureaucratic aspects of information management.

Additionally, the field notes are not presented in the findings as the researcher's observations were topically dealing with the UNOCHA's FIS office's day-to-day activities. While this information was broadly useful in analyzing the case's environmental considerations and developing the coding labels, they did not provide enough useful insight for applying the CGM to the cases. However, these limitations

were overcome by manually interpreting the interview text, supporting literature, and the developed codes in line with the CGM variables.

4.4. SUMMARY

The chapter presented the methodological tools used to treat the data and the overarching epistemology that informed the researcher's fieldwork. Specifically, the chapter gave an overview of social constructionism and explained the case study's interpretive approach. Concerning the analytical methods used, the chapter explained how the case study was organized, the researcher's role in his fieldwork, and the methods used to make sense of interviews and supporting literature: *narrative analysis* and *thematic coding*. The chapter then elaborated on the researcher's engagement with the data concerning the conceptual framework. The next chapter will present the findings according to the Collaborative Governance Model (CGM) and applied to the case studies: HROs and V&TCs.

5

ANALYSIS

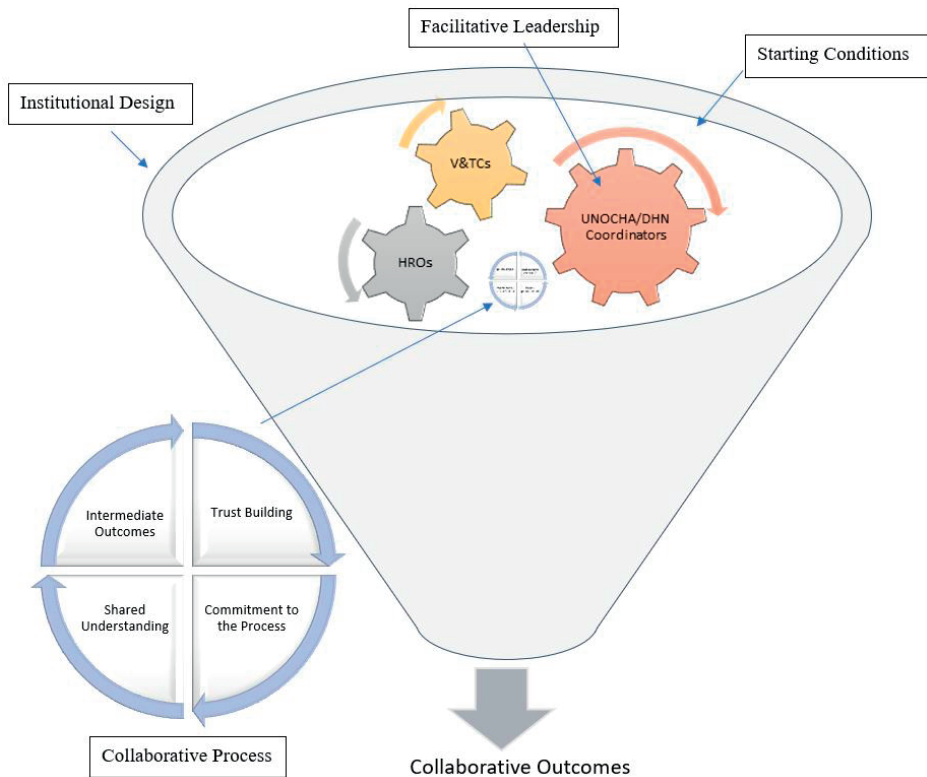
5.1. BACKGROUND

The CGM was designed to study the processual and management reflections on collaboration and how it is governed. We adapt it to the HROs and V&TCs following the example of the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) and the Digital Humanitarian Network (DHN). Both organizations serve as a façade of coordination for their respective networks as well as with each other.

Ansell and Gash described several variables in their model that is ultimately meant to create a measurable product in the form of a policy outcome or a change in the actors' representation. In the case of the HROs and V&TCs, this is complicated as the potential for a policy outcome regarding the V&TCs was linked to their ability to produce information products, e.g., a crisis map, the dashboard for recording different actors coming and going from a basecamp, or a smart-phone application geared for real-time weather updates. It was assumed by the V&TCs that the more useful information products they could produce, the better the likelihood that their representation in the *Collaborative Process* would expand.

Figure 11 offers an adaptation of the CGM to the collaborations of the HROs and V&TCs. In the adaptation for the findings, the HROs and V&TCs are presented as gears that must work together to produce the information products. The *Collaborative Process* between them is leveraged by the two larger gears, the UNOCHA and the DHN. Furthermore, *The Institutional Design* and the *Starting Conditions* shape the *Collaborative Process* and ultimately influence the *Collaborative Outcomes*.

Figure 11: CGM Application for the Case Study



Own illustration adapted from Ansell and Gash (2008)

We will examine each of these variables independently concerning the case of the HROs and V&TCs: *Institutional Design*, *Starting Conditions*, *Collaborative Process*, and *Collaborative Outcomes*. By deconstructing each variable and its associated sub-variables independently, we provide a detailed view of why collaboration has been a challenge and identify those conditions. The analysis will begin with the outermost influences affecting the *Collaborative Process*: The *Institutional Design* of collaboration shared between the HROs and V&TCs *Starting Conditions* before their collaboration. In other words, the negotiated rules for how they will interact. Additionally, the role of UNOCHA and DHN as ‘facilitators’ of the *Collaborative Process* or *Facilitative leadership* will be examined to describe how these two actors motivate their networks to come together. These influences shaped the variables in the *Collaborative Process*. Finally, the chapter will examine the *Collaborative Outcome* that resulted from the HROs and V&TCs engagements.

5.2. INSTITUTIONAL DESIGN: “THE ONLY GAME IN TOWN.”

Institutional Design refers to the necessary protocols and ground rules for a collaboration formed by the actors’ organizational characteristics and their capacity to incentive participation through balanced management (Ansell and Gash, 2008; Emerson, Nabatchi and Balogh, 2012). We begin with an overview of the distinct organizational characteristics in Table 8. The characteristics sketch a picture that reinforces the notion that the HROs and V&TCs start with some significant differences that impact how the collaborations would be structured.

Table 8: Key Organizational Characteristics of HROs and V&TCs

Humanitarian Response Organizations	Virtual and Technical Communities
Institutional legitimacy.	Social, democratic legitimacy.
Hierarchical governance structure.	Peer to Peer governance, loose, informal network.
Organized around their international mandates, significant political clout, limited funding/ resources.	Volunteers’ motivations and fundraising drive them—efforts to becoming useful and meaningful to humanitarian missions.
Robust information needs (Crisis mapping, outsourced-skilled labor, contextual data).	Unparalleled volunteer surge capacities and access to tech-savvy personnel.
Predictable models, governing committee, centralized response to crises.	Multiple contributors, factions, agendas.

Source: Sabou and Klein, 2016

These institutional characteristics show us that although the two networks are very different from each other, the basis for their collaboration was built upon a consensus about the appropriateness of onboarding V&TCs into humanitarian deployments. Chrislip and Larson (1994, cited in Ansell & Gash, p.14) wrote, “the first condition of successful collaboration is that it must be broadly inclusive of all stakeholders who are affected by or care about the issue.” In the case of the HROs and V&TCs, the notion of a ‘stakeholder’ is diluted to the term actor since V&TCs cannot be stakeholders of humanitarian aid (even if some may include people from the disaster-affected location). They can only be contributors pending their formalization and legal accountability. This qualification is significant because understanding the HROs were the primary stakeholders in the relationship with the V&TCs. Thus, the HROs had greater power in setting the rules of engagement for collaborations between the two networks. According to Lars Nissen, director of the Assessment Capacities Project (ACAPS), the HROs have an understanding that they have the latitude to conduct information management in the best ways available to them; that includes inviting V&TCs into non-committal collaborations:

“There is an [informal] agreement that each organization is supposed to manage its information in a crisis using what they have available.... Except not all are equipped the same way, so after Haiti, people started looking at these [digital] volunteers to bridge the technical gap” (L. Nissen, personal communication, 5 December 2015).

Although the V&TCs had some input into the structuring of the *Institutional Design* of the Collaborative Process, the architecture of that design came mainly from the input of the HROs. They are the dominating force behind humanitarian aid and developed some of the best response processes for crisis management in the world. Therefore, the *Institutional Design* of collaboration between the HROs and the V&TCs follows the decentralized governance approach set by the UN Cluster System. The HROs are mandated to lead and govern. As Nigel Snoad stated:

“If there’s a brand that has trust and recognition across the humanitarian community [humanitarian aid sector], then it’s the UN.... One of the problems working with V&TCs is identifying and building up a brand and being able to say, ‘I’m from this group, and here’s how you confirm that I’m working on this or that, so let’s move together’” (N. Snoad, personal communication, 2013).

Nigel Snoad’s statement also falls in line with Nigel Woof’s (MapAction) claims about the fluidity of humanitarian deployments:

“There has been an explosion of actors in the humanitarian sector in the last couple of years, and I don’t think it is realistic to expect a kind of lead dog to emerge [...] whom everybody in the sector will agree to be coordinated by. So, I think the only way to coordinate is to have a cluster-like approach, for all its probable agonies” (Harvard Humanitarian Initiative, p. 50).

Mr. Snoad and Mr. Woof expressed that the idea of ‘governance’ in the UN Cluster System is by design a complex patchwork of agreements rather than an overarching framework. That is because humanitarian aid has too many actors to unify under a single administration practically. Instead, each disaster can warrant a different framework for response and coordination according to the negotiations of the relevant actors of a given situation; typically, these would include the HROs, the host country [government/military], and any major localized organizations. Therefore, the *Institutional Design* was the preexisting framework for coordination between HROs and other ‘formal’ actors in a humanitarian deployment. In a briefing to the government of Indonesia in 2014, UNOCHA summarized the nature of collaboration in disasters according to the UN Cluster System:

“Some of these organizations have specific mandates given to them by international treaties, such as the International Committee of the Red Cross. Others have specific mandates given to them by the UN Member States through UN resolutions, such as the UN Children’s Fund or the World Food Program. However, the vast majority are non-governmental organizations that determine their purpose and focus” (UNOCHA, 2014, Slide 6).

In the case between the HROs and V&TCs, these considerations rested solely with the HROs. Recalling Barnett’s (2013) statement on the subject of governance in the humanitarian aid sector, “professional humanitarians govern” (p. 382). Therefore, the V&TCs, being entirely new to the broader network of formal actors, became part of NGOs’ milieu clustered around the HROs’ leadership humanitarian deployments and lobbied their services in the basecamps. This was problematic for the V&TCs because it meant that they would have to compete for the HROs’ attention with the NGOs while building their coordination capacity. For example, a former DHN coordinator described the challenge of communication and workflow:

“We’re not really setup for a crisis ... Most of the time communication [between HROs and V&TCs] is very good, but sometimes collaborations can end abruptly. I once had to send an email to the person who was heading a project because the person was not communicating with the volunteers, they just dropped out” (C. Furlong, personal communication, 3 June 2013).

This statement indicated that collaboration was dependent on the HROs and their decision to engage in the collaboration. This situation is warned about by Weber and Khademian (1997) who stated that unless actors agree to meet half-way in the negotiation process overrule setting, the collaborative forum would be prone to manipulation. As Ansell and Gash (2008) said, when the collaborative forum is “the only game in town,” it is easier to motivate actors to participate (p. 14). In the collaborations with the HROs, the V&TCs had to conform to the former’s existing rules [on contracting, accountability, and ethics], same as any NGO. Simultaneously, many of the V&TCs, via the DHN, admitted that they were still developing their financial and governance structures to become compatible with those expectations:

“The DHN is a work in progress... they understand the realities, the challenges and what digital volunteers do not do well... We’re trying to learn from successful citizen science projects, such as gamification features... into our space to make sure that [digital] volunteers really experience the value of engaging as digital humanitarians” (P. Meier, personal communication, 21 January 2016).

Collaboration can be tricky when speed, precision, and prioritization are the management imperatives of the existing UN Cluster System. For instance, the traditional process of collecting and analyzing information about any disaster-affected community concern mainly the logistic chains that assume specific rules for their use. In one interview, the IM lead for the IFRC (in the Netherlands) explained how this works:

“Those include assessment teams with different experts and team leaders working together in a regional office or camp-site. They go out into the field, and they have a methodology for assessing the situation, collect data, write the reports, and that’s the product they deliver. We have a clear understanding with most governments on what collaboration looks like and what our role is” (M. Van der Veen, personal communication, 28 January 2017).

This tells us that the HROs had a specific conceptualization of collaboration that implies working within official communication lines—ostensibly with other national and non-governmental agencies with similar mandates. The prospect of working with V&TCs was a development for which the HROs were not prepared. On the other hand, the V&TCs were also unprepared for their rigorousness in humanitarian settings. Their horizontal leadership and structure leaned towards political and social power redistribution organized outside traditional hierarchies (Meier, 2015). For instance, the DHN was founded on activism originating from the 2012 ‘Occupy Sandy’ movement, born out of the ‘Occupy Wall Street’ movement in 2008 (W. Brugh, Harvard University/Digital Humanitarian Network, 19 August 2015). While relevant in different contexts, humanitarian deployments require strict protocols and rigorous information processes that were not common to the V&TCs at the time.

The V&TCs were technologists at heart accustomed to shaping malleable software code architectures to develop platforms or apps for a specific use. While some individuals may have some professional experience in disasters, the V&TCs mostly dealt with software’s rapid development rather than rallying local populations in their relief. Therefore, the *Institutional Design* of the collaborations was, in a sense, braced by the humanitarian ideology of the UN Cluster System. That meant that if the V&TCs wanted to be a part of any humanitarian deployment, they became formal entities [and thus legitimate players of humanitarian aid] or had to play by the HROs rules and at their convenience.

Essentially, between 2012-2015, the UNOCHA repeatedly advised the V&TCs to formalize into non-profits or seek NGO status, which many of them eventually did. Nevertheless, at the height of their collaborations [circa 2015], many of the V&TCs had not yet formalized and continued to embrace the open-source, peer-to-peer philosophy of collaborative problem solving concerning their approach to

information management during crises (Brugh, Sorokin, and Bar-Yam, 2015; Meier, 2015). This was problematic for the V&TCs as few had the experience needed to navigate large disasters' bureaucratic landscape, even when they began to work in them virtually.

5.3. STARTING CONDITIONS BETWEEN HROs AND V&TCs

The *Starting Conditions* can be simplified down to four broad variables: (1) imbalances between the resources or power of different actors, (2) the incentives that actors have to collaborate and (3) the actors' institutional and internal pressures, and (4) their history of conflict or cooperation (Ansell and Gash, 2008). In the case of the HROs and V&TCs, this refers to the power and knowledge asymmetry between them, their incentives and deterrents for collaboration, internal and external pressures or influences generating the incentives/deterrents, and the prehistory of cooperation or conflict. These sub-variables comprise the *Starting Conditions* that shape how the HROs and V&TCs would work together. Indeed, the UNOCHA, IFRC, WHO, and WFP were the first HROs to begin collaborating with the V&TCs via the DHN, and those first instances were successful at a smaller scale. So, at least up to 2015, there was a clear basis for incentivizing and sustaining the Collaborative Process between them. The following sub-sections layout the sub-variables that comprise the *Starting Conditions* of the HROs and V&TCs and speak to the essential background or landscape in which their collaborations were structured.

5.3.1. Power & Knowledge Asymmetries

Power and knowledge asymmetries are common between actors in Collaborative Governance literature (Gray, 1989; Short and Winter, 1999; Susskind and Cruikshank 1987; Tett, Crowther and O'Hara, 2003). The power and knowledge asymmetries refer to the problematic imbalances between HROs and V&TCs in their collaborative *Starting Conditions*. This would seem the case, as the HROs had a much more considerable influence in how their collaborations with the V&TCs would take shape. In fact, in supporting this notion, some interviewees from the HROs expressed that the V&TCs overestimated their value and that their roles turned out to be much more minor than expected.

"What is often missing is a contextual understanding of how DHN can help us. For example, in Nepal, I had a conversation with some of my IM counterparts from different clusters. When I asked them if they knew of virtual support capacities, they did not even know what the DHN was" (J. O'Callaghan. United Nation Office for the Coordination of Humanitarian Affairs, 24 November 2015).

Although this is not an admission of manipulation, Ms. O'Callaghan's statement does reveal that the HROs considered the V&TCs to be much lower on the pecking order of collaboratives that typically occurred in humanitarian deployments. For instance, the HROs faced significant pressure from donors to produce high-profile results with particular NGOs or governments, e.g., the highly publicized response to the Nepal earthquake in 2015 or the ongoing Syrian conflict. The V&TCs, on the other hand, entered the sector of humanitarian aid in 2013 and lacked the organizational infrastructure and accountability that would make them more attractive to the HROs.

"The downside of where things can be slow-moving and stifle creativity is when big actors [HROs] don't know what to expect from V&TCs. That's where the DHN comes in, because its informal, creative, and dynamic, but that's also a problem because then people ask, 'how reliable is dynamism?' Can people trust us when we are so dynamic? So, they're both [HROs/V&TCs] kind of opposites that have complementary strengths, but we're restricted by the formal structure of 'expectation' that accompanies the humanitarian setting" (H. Campbell, personal communication, 18 November 2015).

Collaborative Governance literature warns about smaller actors that have less influence in collaboration than larger ones. Often, actor groups do not represent all actors collectively, and some actors may compete to dominate the Collaborative Process (Day and Gunton, 2003; Lasker and Weiss, 2003). Such would seem the case considering that the *Institutional Design of the Collaborative Process* inherently favored the HROs. Although the HROs had the final word on releasing information products for general use, the V&TCs often led all the collaborations' technical aspects. In this way, the V&TCs mitigated with power imbalance with their knowledge parity, as the HROs continued attempts to leverage crowdsourcing and other capacities:

"I would say on a more frequent basis we have relied on the DHN's sheer volume of volunteers and different groups, skills, or connections to certain analogies to large data requests. I say a majority of the activities has been scanning social media or other online resources for a combination of images to show infrastructure damage or looking for expressions of need mostly through Twitter and Facebook and some other platforms as well" (A. Verity, personal communication, November 2015).

This statement means that the V&TCs' knowledge in the approaches to managing vast volumes of information via mobile phones, satellite imagery, and social media crowdsourcing had afforded them some bargaining power to shape the collaborative rule settings. Due mainly to the earlier success between UNOCHA and DHN, it had

become clear by 2014 that there was great potential in working with the V&TCs. This was apparent in the highly publicized media coverage of those successes. V&TCs that were active during the Arab Spring had much to impart to HROs, having developed detailed verification protocols and used social media information to organize locals into relief initiatives, e.g., #Intafeen.

They also solicited specific eyewitness reports from the crowd, much like the Filipino government did after Typhoon Yolanda, e.g., the public advocacy efforts around using designated hashtags as #RescuePH and #ReliefPH (Meier, 2015, p. 174). These led to robust reporting of those disasters and gained attention among the HROs' donors, and prompted acknowledgment about the potential for enhanced reporting through big data. Better reporting could mean better funding opportunities. If the HROs could harness the knowledge of the V&TCs to produce those reports in an efficient and reproducible way, they might also guarantee the HROs' relevance in humanitarian aid.

As Ansell and Gash (2008) pointed out, no amount of power can substitute for knowledge. In this way, smaller or less privileged actors, specifically the V&TCs, could still be quite effective in negotiating their presence within the UN Cluster System. All that was needed was some support and a policy-based solution that would partner them to the HROs. On the other hand, the HROs had their hands tied; while they could collaborate in 'ad-hoc' or non-committal ways with the V&TCs, they could not engage in bi-lateral agreements without the latter's formalization.

Between February 2013-January 2014, the representation of the V&TCs within the UN Cluster System was taking shape, especially with the support of UNOCHA. However, their activities in humanitarian deployments still depended on personal relationships and formal agreements to ensure accountability. As Kate Chapman pointed out in her interview, *"knowledge of the V&TCs' existence is still mainly traveled by word of mouth"* (Digital Humanitarian Network, 17 November 2015).

Meaning that while the V&TCs did produce innovative uses for big data, their ad hoc connections with HROs limited the integration of those information sources, e.g., reports generated by Nepalese citizens in response to the 2015 earthquake and software to process those streams. The researcher arrived at UNOCHA in the late stages of that response. He witnessed how the UN staff relied on older tools and processes tied into existing workflows rather than utilize the capacities of the V&TCs. Such workflows were built on internal assessment frameworks as the Multi-Cluster Initial Rapid Assessment or 'MIRA,' which were practically unknown to most V&TCs but essential to the HROs' decision-making and bandwidth for collaboration:

“We typically use tools that are designed for frameworks like the MIRA³ [Multi-Cluster Initial Rapid Assessment], or official government statistics on the impact of an emergency, but we also know they might be wrong or off, so we try to take our information positions as fast as possible” (M. Van der Veen, personal communication, 28 January 2017).

The takeaway here is that although the HROs had near unilateral authority in the Collaborative Process, matters of applying newer information streams were the responsibility of the V&TCs, and this knowledge was their only bargaining leverage for negotiating the conditions for their collaborations with the HROs. As knowledge became increasingly specialized and distributed, institutional infrastructures became more complex and demanding, as evidenced by the increasing drive for ‘humanitarian innovation’ beginning in 2014. By that time, the term ‘humanitarian innovation’ frequently appeared at conferences, United Nations panel meetings and appeared increasingly in academic work dealing with the notion of a technical revolution in humanitarian aid. To recap from Chapter Three, ‘humanitarian innovation’ became a common term for any invention dealing with ICT, potentially impacting humanitarian aid. Between 2014-2016 there was a surge of software applications, robotics, and methods developed to leverage ‘big data,’ primarily through social media platforms such as Facebook and Twitter.

Despite the V&TCs lower position in terms of power, their knowledge afforded them a bargaining position in the negotiations for setting the collaborations with HROs. The HROs did passively embrace the notion that social media could play a significant role in their informational processes and decision making. Thus, the V&TCs would have a role, however, limited to responding to new requests to apply their knowledge and technical expertise. This shows that although the V&TCs had limits in the collaborative relationship, the HROs also had to acquiesce some of their authority when the V&TCs operationalized the collaborations.

5.3.2. Incentives/Deterrents to Collaboration: Humanitarian Innovation, Limited Bandwidth, and Uncertainty

The HROs and V&TCs’ incentives to participate in collaboration were tied to how many successful information products or ‘humanitarian innovations’ could be produced. As Ansell and Gash (2008) stated, the incentives/deterrents to collaborate depended in part upon the actors’ expectations about whether the Collaborative Process can yield meaningful results. Between 2013-2015 there was significant hype around the notion of humanitarian innovation and revolutionizing humanitarian

3 The MIRA framework was developed by the IASC in 2012 to address the groundwork for humanitarian decision-making. It is a framework for addressing what knowledge areas are necessary to fulfill logistics deployment to a disaster (MIRA Framework: IASC, n.d.).

aid through 'big data.' That hype was the motivation or 'incentive' which initially carried the attention of the HROs. As one former UNOCHA coordinator stated:

"I think there is room for innovation, and you either adapt, or you become obsolete. So, in terms of outsiders being able to contribute, I think it has been happening and will be happening with this trend in open source platforms, crowdsourcing, and things like that. I think the humanitarian community [HROs] will take all the help they can. However, at the same time, there is a real need to make sure that everyone performs equally on a certain level" (A. Warsame, personal communication, 26, January 2017).

When the notion of humanitarian innovation was at its highest, circa 2014, the UNOCHA attempted to incentivize the HROs to collaborate with V&TCs on their own, but progress was relatively slow. Between the years 2010-2016, there were 51 collaborations organized by the UNOCHA and DHN, and most of those were mapping collaborations (Hunt and Specht, 2016). Of those collaborations, 26 were recorded in 2015, which is considered the peak of the V&TCs presence in humanitarian deployments. Between January 19th to November 16th, 2015, UNOCHA's FIS team recorded 26 collaborations or 'digital activations,' the highest at that time ("DHN activations in 2015 fiscal year", 2015). Technically this was a positive number since the UNOCHA successfully brought awareness about the V&TCs to the HROs, as evident in the steady increase in collaboration requests. However, it also shows that a more extensive integration of the V&TCs to the HROs was lacking.

Consider, of the potentially hundreds of informational activities that may have occurred in 2015 alone, only 26 cases were accounted for in which V&TCs were requested (or brokered) for collaboration ('DHN activations in 2015 fiscal year', 2015). This number could have been higher, but the lack of the V&TCs' articulation of their added-value, even with the assistance of the DHN, was also compounded by three fundamental problems from the HROs: "Lack of bandwidth" (A. Verity, United Nations Office for the Coordination of Humanitarian Affairs, 23 November 2015), "lack of knowledge about the V&TCs" (Y. Link, personal communication, 4 November 2015), and "poor understanding on how best to connect the work that the V&TCs do [into formal information process]" (C. Hendricks, United Nations Office for the Coordination of Humanitarian Affairs, 26 November 2015). As a result, there were fewer requests for collaboration than was expected at the founding of the DHN in 2012. By 2015 the UNOCHA was leading the effort to maximize the V&TCs' visibility among the HROs, but this was still expected of DHN to handle on their own, e.g., making their connections inroads by the marketability of their services and technologies in humanitarian deployments.

As Logsdon (1991) pointed out, the incentives to participate in Collaborative Governance will increase if actors perceive the achievement of their goals to be dependent on cooperation. To this point, all of the interviewees and supporting literature indicated that there was an exact cause for cooperation. The problem lay in actually operationalizing a standard for collaboration through some policy instrument. As Brown (2002) pointed out, incentives increase as actors see a direct relationship between their participation and a policy outcome. Meier noted:

“The humanitarian community [HROs] has, over the decades, developed apparent protocols that guide how information is collected, shared, and used, and these have been extended to digital humanitarians [V&TCs]. However, as new entrants come into play, they ignore the traditional hierarchies because they perceive that there is something they can do that reshapes the playing field” (personal communication, 21 January 2016).

In other words, the V&TCs were driven by the potential to reform humanitarianism rather than the needs of the HROs. Also, without clear definitions for success and a proper baseline for collecting and verifying data, proving the added value of a V&TC was challenging and limited the collaboration’s applicability to scale.

Each collaboration was unique, and the results of one could not necessarily be reproduced in another. While the HROs were opened to collaborating with V&TCs, they never considered them a partner, despite their know-how and knowledge. So, while there were clear incentives to work together and attempt to augment the traditional information management flows, doing so was a confusing process. Additionally, most staff at UNOCHA and other HROs had temporary employment contracts of four to six months, while the most personnel with the V&TCs were mostly digital volunteers. This meant that all the lessons learned and the networks built from previous collaborations had to eventually be turned over to another temporary person that was likely to be deterred by the high workload and frequency of burnout among personnel from both sides. Moore pointed out, many information management failures were attributed to a high turn-over rate among HROs and V&TCs alike:

“Emergency staff are not career professionals anymore; they are volunteers and temporary staff trying to work in difficult situations and adapt to those who, as officers, come and go for some time.” (Op cit, “Humanitarian Information Management Failures Survey,” 15 February 2016).

The incumbents often spent much time reestablishing connections from his/her predecessor or make new ones altogether. The messiness of attempting to collaborate with V&TCs often led many HROs to become disgruntled or disinterested

with the amount of work required to establish a collaboration and instead reverted to their traditional information management flows. As Futrell (2003) explained, the incentive to collaborate can decline if actors perceive their input as merely advisory or ceremonial. In 2015, the V&TCs were still struggling to gain a profile of acceptance among the HROs. The constant resetting of the collaborative space served as a deterrent to collaboration. It meant that individual information officers would have to divert time and energy away from essential duties to set the negotiation table between their respective organization and the V&TCs. The only solution was for the UNOCHA to lead the Collaborative Process management and act as a broker of collaboration until the DHN's coordination group could establish its lasting contacts with the HROs. Although this measure was little more than a stopgap, it becomes the standard throughout the collaborative timeline; 2012-2015⁴.

5.3.3. Pressures and Influences

The HROs were influenced by their pressures for sustaining donor support and competition among each other. To stay competitive, the HROs must align their goals with donor agendas for more attractive portfolios: e.g., nation-building, human rights, and economic development. HROs are under pressure by their donors to find new solutions to their problems and increase budget cuts. This pressure has helped motivate the HROs to collaborate with V&TCs, but the collaborations did not move forward in a deliberative way. For instance, according to a UNOCHA report on UN aid policy by the IRIN Group, “leaders that possess enough self-assurance to risk are strongly disliked in the organizational culture of humanitarian aid” (“Aid policy: Good leaders battle risk-averse humanitarian culture,” 2011).

Unless the Collaborative Process is deliberative, the actors may be pit against coming to the negotiating table due to strategic thinking or insulated competitive pressures (Osborne and Gaebler, 1992). As Andrej Verity explained, strategic thinking and traditional hierarchy were also factoring that put pressure on employees of the HROs. For instance, unless a senior staffer authorized it, individual information officers could not generally start their collaborations. Sometimes, it might be outright discouraged due to the complexity of asking permission.

“The hierarchy was crazy. For example, somebody in Cambodia [information officer from an HRO] could say, ‘oh, I need help creating this thing that helped Haiti.’ However, to do that, he would have to ask the country coordinator, that person then would ask the head office, the head office would then call the desk officer in New York, that person called the head of information management in Geneva for help, and that person reported to the country coordinator” (A. Verity, personal communication, 6 December 2015).

4 See Timeline in sub-section 5.3.4.

The circular hierarchy of gaining permissions to procure alternative information management flows like big data disincentivized many HROs from exploring IM capacity, as staffers were more likely to ignore those in favor of familiar routines. The HROs tended to put their information management capacity first before any collective effort, inspired by the UN Cluster System framework's competitive nature. This harkens to the idea of how HROs could reinvent themselves amid bureaucratic pressures. Andrej Verity commented that this had much to do with the 'business model' of humanitarian aid:

"If you think of it from the business standpoint, how they are trying to go about even thinking of changing their information management processes, this is linked to their ability to stay competitive. HROs have to think about how they will change everything about their business model and how they improve. It is an issue of maturing, which is difficult" (personal communication, 6 December 2015).

Some HROs did develop relationships with V&TCs and began working together with the, increasing regularity. UNOCHA, for instance, became aware of the V&TCs already in the Haiti response in 2010. As stated by Chad Hendricks:

"During Haiti, the OpenStreetMap team provided remote support for things the HROs tried to do but were not familiar with. In one case, they mapped every goat path and road using a combination of GIS data and Twitter data. I get goosebumps just remembering how shocking it was to see the power of this distributed mapping method. We kept using the OSM data, and pretty soon we had other IM groups [HROs] wanting access to that data too" (personal communication, 26 November 2015).

In this way, some information officers began engaging in digital experiments outside their regular imperatives and devoting much of their time to coordinating access to the V&TCs. As pointed out by Moore:

"Essentially, there is an ongoing desire to foster an open-collaborative environment, but in practice, HROs use the prospect of funding to pit V&TCs against one another to determine the best candidates to work with" (R. Moore, personal communication, 15 February 2016).

Trends toward collaboration arise from the growth of knowledge and institutional capacity (Powell, 1990; 1996). As knowledge was specialized and distributed among the V&TCs, the institutional infrastructures of the HROs became more complicated but not interdependent. One of the critical challenges reconciled the V&TCs' supply-driven approach to capacity building versus the HROs' traditional

needs-based demand. These two views were ingrained in both sides' internal pressures, manifested in two separate work cultures.

Organizational culture was cited by several interviewees [mostly from the V&TCs' side] that spoke of the United Nations' organizational culture towards humanitarian aid as risk-averse to innovation partly because digital capacity-building had to be tailored to individual and national circumstances. For instance, one theme pertinent to the utilization of crowdsourced mapping methods was a humanitarian deployment's political environment. Multiple interviewees (Link, personal communication 2016; Verity, personal communication, 2016) highlighted the difficulty of using crowdsourced methods in humanitarian deployments where repressive regimes were present, e.g., Syria, Myanmar. When HROs worked in such regions, there was an ever-present atmosphere of fear and reservations towards open data, especially from social media sources. In other words, the visibility of the V&TCs remained limited because there was not a holistic approach to existing information management flows in regional and subregional bodies and other relevant organizations that might promote digital capacity-building (Hunt and Sprecht, 2016).

UNOCHA was especially active between 2013-2015 to raise awareness about a clear technical gap between practical information versus institutional capacity among the HROs, and the potential solutions to collaborate with the V&TCs. As the competitiveness of some HROs increased, other HROs steadily opened up to the potentials that the V&TCs could bring to them. Between 2014 and 2016, the HROs changed their perceptions of big data's utility and used it under certain conditions. The V&TCs, on the other hand, desired recognition, which mirrored the extant difficulties of their HRO counterparts. Those difficulties entailed managing the expectations of the HROs and proving their worth, particularly to the teams in the field dealing with complicated logistics and the consequences of a disaster. Reports of failure in past humanitarian deployments, e.g., Haiti and Darfur, have resulted in harsh criticism of the HROs and instilled, in some parts, a culture of fear:

“Failure is stigmatizing. At a personal level, it is associated with negative self-confidence and fear of job loss. At the organizational-level, failure relates to poor reputation and the threat of funding cuts. Applied within the humanitarian context, failure may be associated with misallocation of resources, added with the layer of human attrition being associated with the term” (R. Moore, personal communication, 15 February 2016).

While it is not fair to suggest that HROs feared collaboration, many were undoubtedly wary of it against their mandates' backdrop, lack of technical knowledge, and pressures attributed to donor attraction and competition. The V&TCs also had

their pressures that shaped their preconditions before a collaboration, but these concerned the extent that their formalization would take shape and whether they should seek alternative venues. Between 2012-2016, the V&TCs were much more invested in the prospects for collaborating than the HROs. In August 2017, during the Atlantic Hurricane Season, the V&TCs began working with national agencies more often than the HROs.

“There are always challenges in growth, with any new program in its infancy, it has to go through growing pains. We had no hesitation working with traditional humanitarian entities [referring to the HROs]. We recognized that there was a disparity...there was a large disparity between social media and formal organizations. Nevertheless, we had no hesitation.” (C. Graham, Humanity Road, 3 June 2013).

Graham’s statement indicated that the HROs and V&TCs could be affected by their mission-driven identities and institutional cultures that’d developed from the pressures mentioned. Tang (2008, p. 38) calls this sociological institutionalism, which emphasizes how organizations are influenced by the pressures generated from their organizational field. The case with the HROs and V&TCs is that their collaborations took shape amid the HROs’ internal pressures requiring them to be alert to opportunities to shape the Collaborative Process in their favor. On the other hand, the V&TCs focused on promoting their services in the field rather than orienting their capacities around the aid beneficiaries’ needs.

5.3.4. Prehistory of Cooperation or Conflict

The history of the cooperation/conflict can be found in the extensive literature produced regarding the emergence of V&TCs and the concept of ‘big data’ in humanitarian aid (see Chapter Three). Regarding the relationship between the HROs and V&TCs, these did not practically come to fruition until the founding of the DHN in 2012. Essentially, there was no prior history between HROs and V&TCs that would afford them the experience of having learned from one another as equal collaborators.

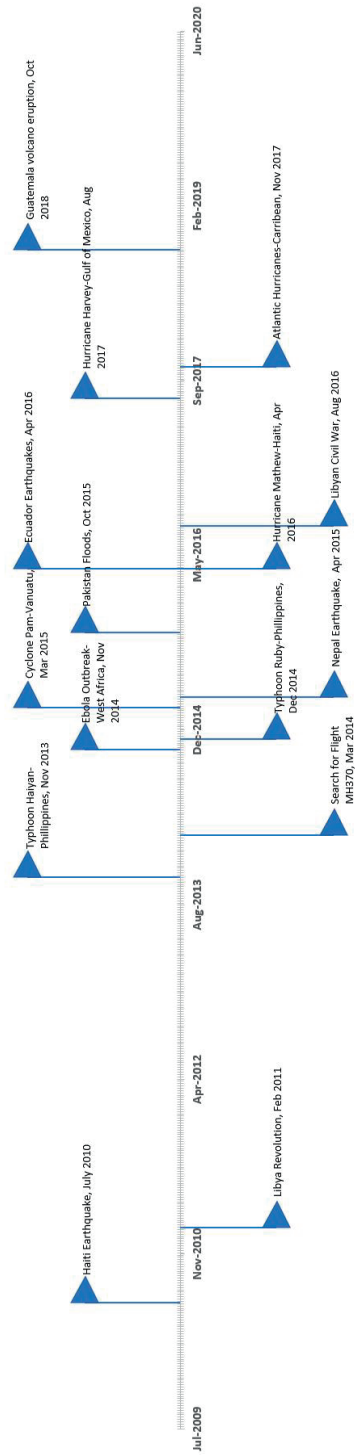
All collaboration with V&TCs preceding the formation of the DHN was almost exclusively with the UNOCHA, and their experiences were quite positive. A history of successful past cooperation can create social capital and high levels of trust that produce a virtuous collaboration cycle (Andranovich, 1995; Gray, 1989; Margerum, 2002). The experience of the UNOCHA with the V&TCs led to the sponsorship of DHN and its founding. Through UNOCHA, the DHN and its member V&TCs would have access to the HROs.

It is on the UNOCHA's past successes that the HROs and V&TCs based their initial willingness to collaborate. Ansell and Gash (2008) pointed out that "mediators are keenly aware of us versus them dynamics that are poisonous to a successful collaboration" (p. 11). Prehistory of conflict is likely to express itself in low levels of trust, which will produce low levels of commitment, manipulation strategies, and dishonest communications. In the case of the HROs and V&TCs, this has not necessarily been the case, not in the typical antagonism manifestation. The HROs and V&TCs had no reason to begin their collaborations with antagonistically. There were no significant experiences with one another before 2012 except for those of the UNOCHA.

Haiti is credited with being the first timestamped event in which modern information technologies debuted a humanitarian crisis. However, in Libya, the digital volunteers showed the social implications for the use of those technologies. Soon after was the first crisis mappers conference in 2012, to which several UNOCHA senior managers. Together they agreed that the V&TCs needed a collective front to organize their efforts and work in tandem with the HROs. The relationship between the UN Cluster System and the DHN began in earnest during Typhoon Haiyan in the Philippines in 2013. Following the lessons from that, the Activation Protocol was established.

Between 2013-2015, there was a significant uptick in relations mainly due to the UNOCHA's leadership. This was also the time when the challenges to their collaborations manifested the most. In several discussions with UNOCHA staff, it became clear that there was a significant disconnect between the UN information management flows and the crowdsourcing processes of the V&TCs. These contributed to a growing ratio of failures and the lack of available coordinators to troubleshoot them. This analysis offers a timeline of events and points out the UN/DHN relationship's peak and crevice. The timeline illustrates events that follow the United Nations and the Digital Humanitarian Network's relationship, from beginning to end.

DHN Activations Timeline 2010-2020



(Own Illustration)

The timeline does not represent all the possible events in which ‘digital humanitarian’ have been active, but it uses the DHN’s record of the high-profile collaborations⁵. Patrick Meier’s book “Digital Humanitarians: How Big data Is Changing the Face of Humanitarian Response” (2015) goes into detail regarding the history of the ‘digital humanitarians,’ a.k.a. digital volunteers, a.k.a. volunteer and technical communities [referred to as Virtual and Technical Communities herein]. So, we will not be retelling that story here. Rather our timeline represents instances in which the V&TCs via DHN were active with HROs about some informational work connected with the events given. The events themselves were all highly publicized, with some reports even cited the efforts of the V&TCs. When the V&TCs first emerged in the Haiti response, no one in the UN had imagined they would persist as a humanitarian force well into the decade of the 2010s.

The period between 2015-2018 shows a significant decline in activations and indicates a significant shift in the DHN and UN Cluster System relations. Ultimately, new collaborations or collaborations that start with actors opposing one another require facilitative leadership that is willing and able to manage the *Collaborative Process* toward a productive result (Ansell and Gash, 2008). Again, it must be reiterated that the HROs and V&TCs had no reason to be antagonistic; however, they did require the *Collaborative Process* management and as activists for ‘humanitarian innovation.’ We attribute this to three issues: the modeling of all collaborations on the UN Cluster System framework, the lack of initial incentives to collaborate, bureaucratic influences and pressures, and insufficient familiarity with the technical knowledge needed to make use of social media in existing workflows. All these issues together would require the permanent presence of facilitative leaders.

5.4. FACILITATIVE LEADERSHIP: ROLE OF UNOCHA AND DHN

Facilitative Leadership is a critical ingredient in bringing parties to the table and steering them through the *Collaborative Process*’ rough patches (Chrislip and Larson 1994; Huxham et al., 2000). Although unassisted negotiations are possible, it is overwhelmingly agreed that *Facilitative Leadership* is critical for bringing actors together and ensuring inclusivity (Chrislip and Larson, 1994; Ozawa, 1993; Reilly, 2001; Susskind and Cruikshank, 1987). In the case of the HROs and V&TCs, their collaborations were usually facilitated by coordinators from the UNOCHA and DHN.

To be clear, the term ‘facilitator’ here reflects the organizations: UNOCHA or DHN, in the sense of the HROs and V&TCs representations of each other or façade. Practically, however, facilitator meant ‘coordinator’ of collaboration, and these were individuals with unique backgrounds and knowledge about the organizational and

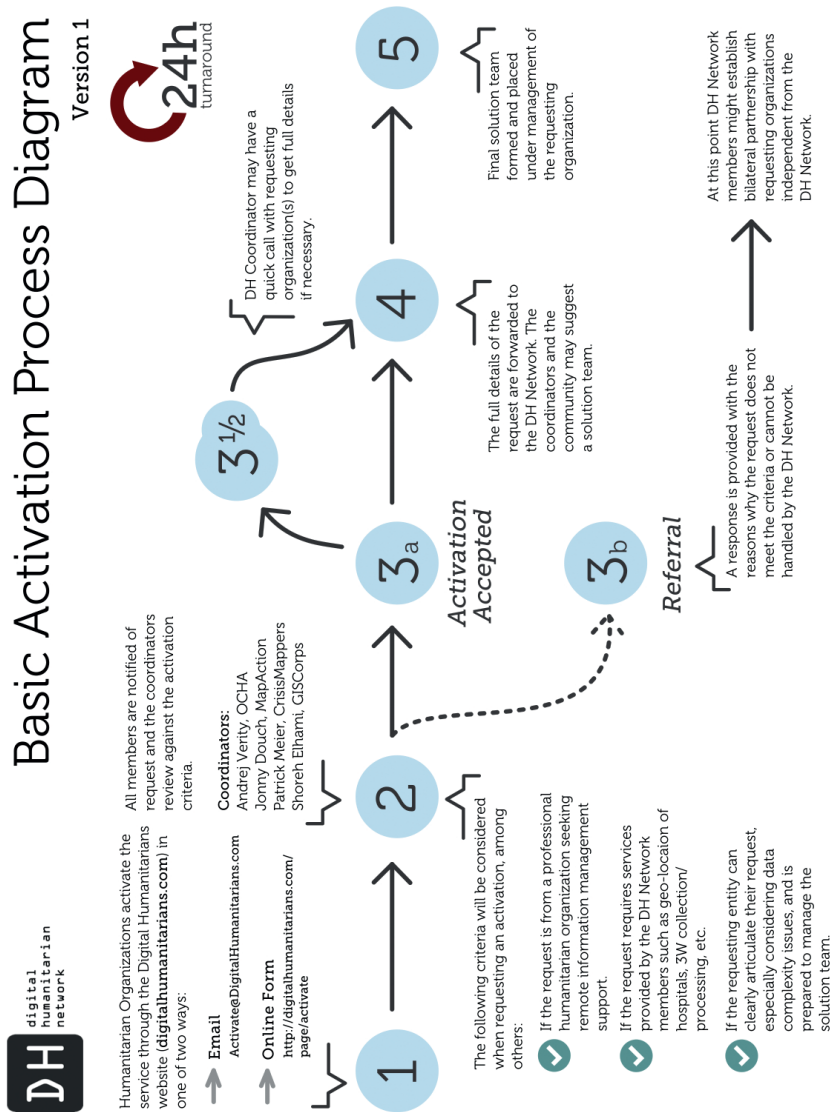
5 See: <https://www.digitalhumanitarians.com/dhn/past-news-and-events/>

informational considerations of both camps. Although there were never more than two dozen individuals between 2012-2017 who worked actively as full-time coordinators for or between the HROs and V&TCs, their presence in the collaborations was integral.

"It sounds negative, but people usually want somebody in the middle to hold their hand through the process. While I can get collaboration started, I can't stay plugged in throughout that exchange. When I say we're busy trying to encourage our information officers to work with V&TCs, it is with the expectation that there's going to be a point where we can step out from that layer. They will get it and go" (A. Verity, United Nations Office for the Coordination of Humanitarian Affairs, 23 November 2015).

Shortly after the Haiti crisis, the Harvard Humanitarian Initiative (2011) asserted that the lack of a formal contact point with the V&TCs overwhelmed the responders managing data within humanitarian deployments. There are rather generic information products such as maps, which show where help is needed by supplying textual or visual information (Van Gorp, 2014). These provided necessary information that addressed the information needs of several HROs. However, for these to be applied in the field, the humanitarian professionals who were not necessarily information officers would have had to be educated in their use (Starbird and Palen, 2013). Since collaboration occurred exclusively in humanitarian deployments dealing with the response phase, education was impossible on the spot. Instead, the UNOCHA and DHN created the 'Digital Activation Protocol' to enable the HROs and V&TCs to facilitate collaborations themselves.

Figure 12: Digital Activation Protocol



Source: Digital Humanitarian Network, n.d.

In figure 12, the case involves the WHO requesting the DHN to geo-locate field hospitals following the onset of a tsunami. The HRO must first detail the request's nature via an online form, which would then be processed by a DHN coordinator. The coordinator then contacts an available V&TC, in this case, MapAction, and together they engage in a virtual meeting with the requesting representatives (usually an information officer) to decide on a set of ground rules about how they will collaborate. The two parties would then organically work together, ironing out their difficulties along the way to the intended information product. At the time of the research, the V&TCs were most often requested “crowd-generated data such as social media feeds and photographs, with geographic data ... in support of crisis management” (Shanley et al., 2013, p. 866).

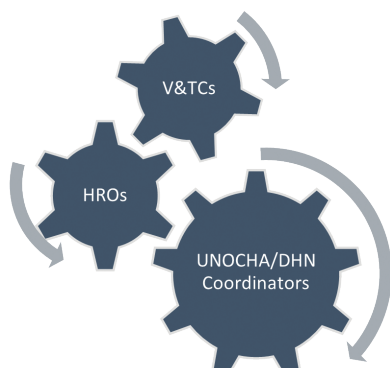
The collaborations were referred to by UNOCHA and DHN as ‘digital activations,’ but we keep to the term ‘collaboration’ for consistency. By October of 2015, the DHN had been activated 51 times involving humanitarian deployments to South Sudan, the Philippines, Samoa, and Syria. In each case, the requesting HRO sent a central request to the DHN, and those collaborations would be coordinated by either a representative from UNOCHA or DHN. Thus, the DHN coordinators became tasked with responding to activation requests made by HROs requiring the specialist assistance of the UNOCHA in matching those requests to the appropriate V&TC member and translating their knowledge or perception of added value back to the HRO.

“These innovations often evolve through personal contacts who engage with you and who are supportive of your work in the first place. Andrej has been working to make the DHN less about the individual [him] and more about the interface, as evidenced by the rotation that recently occurred vis-à-vis the DHN coordinators” (P. Meier, personal communication, 21 January 2016).

The longer that someone like Andrej could help manage the collaboration and act as a middleman, the higher the likelihood of a successful output, e.g., information product in the form of a crisis map or report. Their role evolved from only sparking the collaborations toward creating informational products to ensuring the integrity of consensus-building and management of the Collaborative Process whenever possible. For instance, if initial attempts by DHN to set up collaborations with HROs were unsuccessful, then the help of persons like Andrej Verity was integral to incentivizing the actors to come together. This was confirmed by Yaelle Link, an information officer, and colleague of Andrej Verity:

“I always go through Andrej if I’m deployed and when I think I might need the DHN. I’d say something like, ‘can you advise on whom to contact?’ I would go through this channel first because I know he has those contacts, and it saves me much time” (Y. Link, personal communication, 4 November 2015).

Figure 13: Motor of Facilitative Leadership



Chrislip and Larson (1994) describe the facilitative leader or ‘facilitator’ as a steward of the Collaborative Process, e.g., a diplomat or social broker (p. 125). *Facilitative leadership* in the case of the HROs and V&TCs meant that UNOCHA and DHN coordinators had to mediate the negotiations on rule-setting, ensure inclusivity and engage as translators added value. Usually, it is assumed that a strong interconnection between individual networks exists. When it does not, then the impetus to build such connections falls to the facilitator and leverages the actors into mutual compromises (Ansell and Gash, 2008). This can be visualized in Figure 13, where facilitators act as the motor’s activating gear, drawing in the HROs and V&TCs toward each other through their management’s motion. Figure 13 shows the HROs and V&TCs as separate entities that cannot move towards collaboration without a motion from the UNOCHA and DHN.

In other words, HROs and V&TCs both needed to be incentivized to engage in the Collaborative Process organization despite the Digital Activation Protocol’s existence. Although the protocol did give some contextual support for how the DHN and HROs could spark collaborations, the protocol still depended on whether the HROs knew about the V&TCs. Therefore, more support from UNOCHA was needed to directly manage the collaborations and incentivize the HROs to work with the V&TCs.

“On occasion, [UN]OCHA has provided one of their staff 10-20% time to help support DHN Coordination. Suppose this capacity is in place during your time as Coordinator. In that case, you should arrange discussions to determine the division of labor and responsibilities” (Op cit, “Digital Humanitarian Network Coordinators Terms of Reference,” 10, August 2016).

Andrej and the FIS staff did end up managing some of the coordination between their colleagues in the field [other HROs] and the DHN, but this required a

tremendous amount of energy and personal investment to make the relationship work. As Lasker and Weiss (2003) explained that facilitators must have the skills to (1) promote broad and active participation, (2) ensure broad-based influence and control, (3) facilitate productive group dynamics, and (4) extend the scope of the process (p. 31).

The UNOCHA and DHN were an integral part of the collaborations, yet only a handful of coordinators. Since collaboration needed to be incentivized, strong leaders such as Andrej had to act as social brokers to support the controlled transfer of specialized knowledge from the V&TCs and the HROs and troubleshoot misunderstandings between them. Long and colleagues (2013) explained that individual leaders become intermediaries, translators, and diplomats to manage the transfer of knowledge and articulate the positions held by their owners.

In this case, *social brokerage* refers to a UNOCHA/DHN coordinator's action tapping their contacts to spread the word about the V&TCs throughout the professional networks of the HROs, mainly information officers in the context of the information management dimension. Therefore, the coordinators were facilitators of the *Collaborative Process* critical for advancing the conversation and thought around how the V&TCs could fit the traditional information management flows and beneficiaries' needs. However, this role did not end in merely bridging the cultural and communication divide between HROs and V&TCs; it also evolved into a management capacity.

Associated with *social brokerage* activity was also the *boundary-spanning* behavior, which also was tied to articulating the V&TCs' added-value. The facilitators between actors, crossing between their work cultures and institutional barriers, mediate the *Collaborative Process* (Friedman, 1992; Gray, 2008) as they brokered inclusivity and representation (Borgatti, 2006). In other words, the UNOCHA and DHN coordinators brokered collaborations by maximizing the understanding of the needs in the field and the ICT capabilities available from the V&TCs. These needs were articulated and managed by individual coordinators such as Andrej Verity, Craig Williams, Helen Campbell, Roxanne Moore, or Heather Leson. As coordinators, they were committed to the successful negotiation of terms regarding how they would collaborate and, therefore, the activity of '*social brokerage*' was the catalyst to spark the actors into joint motion:

"For the case of DHN, I think the obvious question is who is on their end making the magic happen? Making connections? Putting people and projects together? If it were someone with the same traits as Andrej, I wouldn't be surprised that that's why it's worked" (K. Meesters, personal communication, 13 November 2015).

Initially, between UNOCHA and DHN, the collaborations worked well because Andrej and several of his colleagues had already been working with the V&TCs shortly after Haiti. They knew about them a great deal and the potential they could bring to the network of HROs. Between 2010 and 2012, UNOCHA was already advocating for reform about 'humanitarian innovation' and started supporting initiatives to bring awareness of the V&TCs to the HROs. However, to do that, they had to translate their added value to specific ways V&TCs could support information management in terms the HROs could understand. As expressed by one former coordinator, it was all about becoming a part of the institutional memory of the actors involved:

"Collaboration unfolds with personal relations, even in the case with the HROs, once the interlocutors change, even if the collaboration was good, it's not a given that the collaboration will continue. If they give you access to the media or press relations or get the chance to speak or talk to managers, you go for it to become part of the institutional memory. Just because you speak to one person does not mean that the rest of the organization will get to know your V&TC" (S. Sudoff, CartONG, 12 June 2013).

The facilitators had to be very flexible and very familiar with both cultures of the HROs and V&TCs. Essentially, the coordinators would need a boundary span between the collaborating HROs and V&TCs and articulate both parties' needs and nuances. An example of this would be Andrej transmitting the field's needs and articulating those needs in a technical solution. Then, do the same translation from the technical solution's perspective to the people on the ground.

Transmitting IM tasks to the appropriate capacities is a matter of personal leverages, such as knowing where to tap resources. Personal connections matter, as does building them (R. Moore, personal communication, 15 August 2015).

This two-way communication was time-consuming but essential and could not be done by part-time staffers or volunteers. It required a dedicated team of individuals well-versed in the technical capacities of the V&TCs, the bureaucracies of HROs, and the individual ideologies and motivations involved in the legal and political context of humanitarian aid [and the given deployment]. Thus, *Facilitative Leadership*, in this case, was a complex mechanism of balancing social networks and working to bring them closer together.

UNOCHA and the DHN acted as facilitators responsible for bringing the HROs and V&TCs closer together. Specifically, through their coordinators, the UNOCHA and DHN were the leaders that 'facilitated' collaboration at a limited scale with the

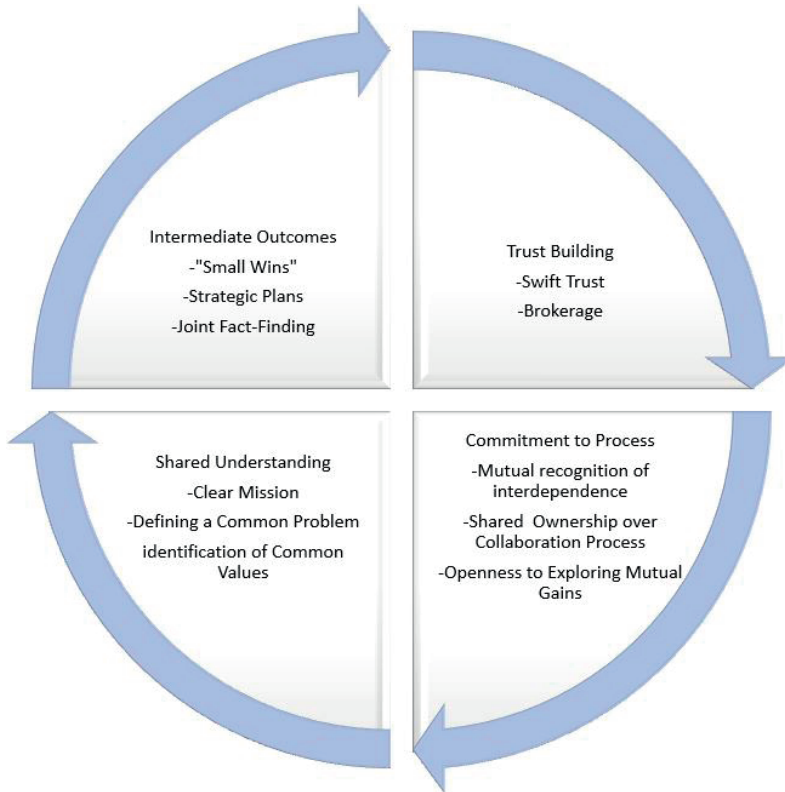
intent to expand the collaborative bridge between the two networks over time. Of course, this arrangement introduced another layer of communication and complexity as another point of failure. The coordination network meant that the two networks of HROs and V&TCs would have to merge at some point if a revolutionary scale technical adoption was going to occur as predicted by pundits of the 'humanitarian innovation' trend between 2013-2016.

The UNOCHA and DHN played an essential role in which both HROs and V&TCs could rely on one or the other to address and articulate their ideas and represent both in a more-or-less equal manner. The articulation concept is related to *boundary spanning* or 'speaking the language' of both sides (Strauss, 1985). The more uncertain the environment, the more articulation was necessary. Typically, it is assumed that a strong interconnection between individual networks exists. When it does not, the impetus falls to the facilitator to leverage the actors into mutual compromises (Ansell and Gash, 2008). In the case of the HROs and V&TCs, that responsibility did indeed fall to the UNOCHA and DHN, and more specifically to the coordinators of both organizations who served as brokers, translators, facilitators, and most importantly, as leaders of the *Collaborative Process*.

5.5. THE COLLABORATIVE PROCESS

The *Collaborative Process* itself consists of five variables that determined whether the HROs and V&TCs could feasibly work together. These are *trust building*, *shared understanding*, and *intermediate outcomes*. As previously explained, our CGM adaption does not include *Face-to-Face Dialogue* as all collaborations occurred exclusively via virtual means. The following sub-sections explain each of these sub-variables and detail how they affected or manifested in the *Collaborative Process*.

Figure 14: Collaborative Process Adaption for the Case Study



Adapted from: Ansell and Gash, 2008

5.5.1. Face-to-Face Dialogue

Traditionally, *Face-to-Face Dialogue* has been at the core of the process of breaking down stereotypes and other barriers to communication that prevent exploration of mutual gains (Bentrup, 2001). It is also considered to be at the heart of a process of building trust, mutual respect, shared understanding, and commitments to collaboration (Gilliam et al., 2002; Lasker and Weiss, 2003; Plummer and Fitzgibbon, 2004). Since the collaborations between the HROs and V&TCs were virtual, the UNOCHA had to bring the DHN coordinators into the formal communication channels of the HROs and manage those interactions directly.

Only some V&TCs like *StandbyTaskForce*, *MapAction*, and *GitHub* gained enough credibility between 2012-2015 to be generally accepted by the HROs without a coordinator's need. In most cases, though, the coordinator's support was crucial. Therefore, coordinators such as Andrej had to leverage their professional networks to encourage introductions and push collaborations forward. As mentioned in

section 5.2., the V&TCs had few, if any, representatives in the field to negotiate their presence in humanitarian deployments. Much of the activities in humanitarian deployments depended on personal relationships. Due to a lack of such connections, the V&TCs were hard-pressed to compete for the attention of the HROs.

“The connections between the UNOCHA and DHN are minor and inconsistent. We need to explore better face-to-face value and commitments. We need ‘in-country’ coordinators who should be in there with us” (J. O’Callaghan, personal communication, 24 November 2015).

The HROs had their network of relations and internal culture, which Andrej could access, and relationships leverage to encourage broader interactions. The HROs’ professional networks were built over decades and among veterans of humanitarian deployments. Nearly all of their operations are built on personal contacts and boundary spanning. Leveraging relationships is a common way of securing commitments in the bustle of humanitarian deployments. They share the common ground of being crisis management professionals and regularly see one another in deployments. In practice, they can boundary span across their networks because they have developed predictability through face-to-face interactions in the field.

“The majority of collaborative relationships grow out of face-to-face environments, where collaborative partners have an opportunity to put a face to a name. Trust and reliability are critical elements that establish collaborative relationships in person and within a community setting to solidify the relationship.” (N. Chang, Internews, 2013).

Regarding the V&TCs, the lack of Face-to-Face Dialogue is closely linked to the limited number of DHN coordinators. This severely inhibited the V&TCs’ ability to present themselves properly to the HROs and articulate their add-value within a base camp’s traditional collaborative space in the field.

“When you deploy, you’re on the time constraints, and you want useful insights from people, the ones whom I’ve worked within the past are the people I contact first” (Y. Link, Y. Link, personal communication, 4 November 2015).

There are additional implications for the lack of V&TC representations, but these will be explained elsewhere in the chapter. Suffice it to say that not having that representation in the field was indeed an issue for the V&TCs and complicated their attempts at establishing Trust, Commitment, Shared Understanding, and a limited number of Intermediate Outcomes with HROs. Nevertheless, as stated in Chapter Two, it is accepted that Face-to-Face Dialogues are not entirely necessary for collaboration to succeed. Most information officers commonly share virtual

communications such as Skype and Slack channels to communicate and Google docs to share documents. The traditional obstacles to collaboration, such as stereotypes or status differences, could be overcome indirectly (Burt, 2001; Ferrin, Dirks, and Shah, 2006). Such was usually the case between the HROs and V&TCs, as both sides' demystification was achieved via virtual communication. Therefore the challenge was to instantiate collaboration by incentivizing the HROs to engage the V&TCs, which could not be done without the coordinators.

5.5.2. Trust Building

As Ansell and Gash (2008) stated, collaboration is not merely about negotiation but also about securing its sustainability through *Trust Building* practices. Unfortunately, the absence of *Face-to-Face Dialogue* made it difficult for the V&TCs to engage with the HROs indirect practices that demystify each other's stereotypes and reduce risks. The V&TCs struggled to engage in practices that could build trust organically due to the basecamps' lack of representatives.

"During a disaster, trust-building is tough as it involves having predetermined protocols based on training and experience working with those in your field. It's common for information officers to meet outside disaster timescales, but the V&TCs only started being invited to these training recently [2015]. The DHN needs to build trust ahead of deployments, but this will take time" (K. Chapman, personal communication, 17 November 2015).

As Luhman (1979) and Blomqvist and Ståhle (2000) pointed out, *Trust Building* is a set of practices for reducing risk and uncertainty. These practices usually require direct and longitudinal engagements (Stevens, MacDuffie, and Helper, 2015). However, the absence of *Face-to-Face Dialogue* in short-term instances of intense collaborations did not present specific examples of *Trust Building* because the V&TCs, via the DHN, was still attempting to grow their presence in the organizational landscape of humanitarian aid circa 2015. Nonetheless, the production of trust by the coordinators' efforts through *social brokerage* and *boundary spanning* did manifest in the form of trust cultivation known as 'swift trust.' This swift trust is "a unique form of collective perception that manages issues of vulnerability, uncertainty, risk and expectations" (Meyerson et al., 1996, p. 167). For instance, information officers from the FIS, such as Andrej Verity and Craig Williams, were instrumental in leading a bottom-up approach to trust development among their peers.

"Andrej is the quintessential champion within the more traditional organizations [HROs]. When you have people like him pushing their colleagues to get more engaged, this is a great thing" (N. Chang, Internews, Op cit, "Collaborative Re-orderings in Humanitarian Aid Networks," 8 March 2014).

Trust Building took on an atypical form in that it was not cultivated over time but produced in short and fast instances of collaboration. Commitments were often hastily formed due to the unpredictable nature of the disasters and the drive for actors to move quickly. Thus, swift trust was used as a form of social currency to incentivize some HROs to work in fast but open experiments. In this way, 'swift trust' was essentially the stabilizing agent that enabled the gears of *Facilitative Leadership* into a continuous motion, e.g., Andrej's reputation among his colleagues in both networks was enough to entice individual HROs and V&TCs to consider exploring collaborative possibilities together.

As stated, the DHN was still dependent on information officers from UNOCHA, despite having a slowly growing coordination network that had just started to make inroads with the HROs by 2015. If given more time, the DHN may have eventually become embedded enough in the HROs' institutional memory to warrant independent collaborations. Indeed, this was the goal of the DHN from its inception. Unfortunately, much of the nuances associated with *Trust Building* occurred in the field, and as stated earlier, the DHN typically did not field a presence in the UN base camps. Since the DHN coordination group was still growing, much pressure was shifted to the UNOCHA to facilitate 'swift trust.' This worked practically with the UNOCHA coordinators vouching for their counterparts in the DHN.

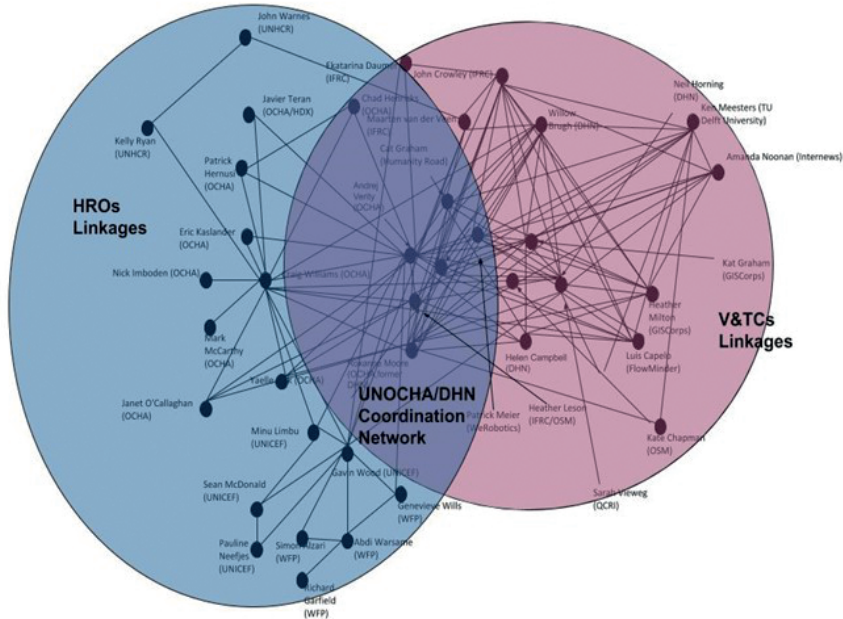
There are positives and negatives to swift trust: its advantage is that actors can expect high return rates when they know they must act reciprocally [...] the disadvantage is that the degree of geographic diversity and reach is limited to the availability of contacts in key positions (Meyerson, Weick, and Kramer, 1996). For this reason, the swift trust had to be attained through the coordinators, as they essentially accrued trust quickly with their reputations as trusted facilitators, and traditionally this conversion occurred within the base camps of the humanitarian deployment zone.

"HROs wish to be relevant in an increasingly technological and sophisticated landscape. However, their highly centralized management regimes were designed for an era outside the internet and when information could be more easily controlled" (E. Kaslander, personal communication, November 2015).

Additionally, DHN coordinators like Roxanne Moore, Heather Leson, Helen Campbell, Neil Horning, Luis Capelo, and Cat Graham also became important organizational translators that articulated both networks' needs and positions. For instance, the articulation of the V&TCs capacities and the needs of the HROs in the field was crucial for developing trust in short-term collaborations. These practices involved the reordering and stabilizing of the HROs and V&TCs personal networks, as evident

in the formation of a third coordination network still in its infancy. An example of what this looked like is given in Figure 15:

Figure 15: UNOCHA/DHN Coordination Network



Own Illustration

The figure gives a representation of the UNOCHA's and DHN's budding coordination network. The individuals or nodes within represent the pathways by which a stable collaboration could be facilitated, thus increasing the chances of a successful outcome. It also indicates the HRO and V&TC linkages that were known to have collaborated at some point between 2012-2016. It should be noted that this image does not represent the full extent of connections between HROs and other humanitarian professionals, nor the V&TCs. Each of the contacts given may have had dozens of their networks that branched throughout the field. Therefore, these connections represent only those willing to collaborate or were known one time or another.

The middle network began small, with a handful of UNOCHA information officers training DHN coordinators to collaborate with HROs. By 2015, the number of persons who could do this rose to a dozen, with further expansion plans. It was expected that by 2017, the budding network of coordinators shown wedged between the networks of the HROs and V&TCs would overlap enough that an entirely new network order would have emerged and redistributed the sense of

ownership and commitment to the *Collaborative Process*. Unfortunately, the two networks remained loose and largely isolated from one another despite having some select members develop a mutual coordination network.

As stated above, many of the HROs rely on an antiquated system of communication and rapid trust creation. Swift trust is nearly related to ad-hoc commitments from the HROs, which could not be achieved without the support of well-connected, highly respected coordinators—in our case, the employees and members of the UNOCHA and DHN. Together all three: the HRO, the V&TC, and the coordinator (representative of the UNOCHA/DHN) effectuated swift trust as a mechanism to stabilize the *Collaborative Process*.

Known individuals in the HRO network, e.g., Andrej Verity or Craig Williams, essentially vetted the DHN coordinators like Helen Campbell. Together, they built their mixed coordination network consisting of personnel from both the UNOCHA and the DHN. As expressed in Andrej Verity's blog on the issue of trust in humanitarian settings: *"The development of 'hubs' or 'nodes' played a crucial role in the robustness of the network..."* (Milner, Verity and Macau, 2013). Therefore, we view the evolution of trust development between the HROs and V&TCs as a complex process entailing more profound transformations in the participants' existing network structures and identities.

The stabilization of the *Collaborative Process* essentially occurred through intense instances of interaction leading to evidence towards the professionalization or formalization of the V&TCs in that: *"a majority of them [V&TCs] are [now] legal entities, even some of the ones that started in some way from wanting to be staunch 'volunteers forever' have formalized"* (A. Verity, United Nations Office for the Coordination of Humanitarian Affairs, 23 November 2015).

5.5.3. Commitment to the Process

Commitment to the process is related to the original motivation to collaborate (Alexander, Comfort, and Weiner 1998; Day and Gunton, 2003). However, it poses a dilemma since it requires an up-front willingness from actors to abide by deliberation results (Margerum, 2002; Tett, Crowther & O'Hara, 2003). In the case of the HROs and V&TCs, commitments were challenging to obtain because the collaborations' nature was considered ad-hoc. At the organizational scale, the HROs (except UNOCHA) were not significantly invested in collaborative efforts with the V&TCs to sufficiently commit themselves to a permanent partnership.

"The nature of the collaborations was ad hoc, open-source, basically anything that could be shared without a high risk of compromising anyone's safety or

security, especially the HROs and beneficiaries of aid” (R. Moore, personal communication, 15 August 2015; Moore, 2016b).

Since the collaborations were considered ad-hoc, securing commitments from the HROs required considerable networking to seek out teams in the field whose information needs could be complemented with the V&TCs. On the other hand, the lack of articulation of added value by the V&TCs also contributed to inadequate commitments from their side. The coordinator network mentioned earlier had to manage both sides’ expectations and generate feedback through consistent communication as time and circumstances permitted. Because time was always an issue, most HROs had their collaborative networks preestablished with other NGOs and had fewer opportunities to explore collaborative possibilities with the V&TCs.

“WFP rotates its people between the field and HQ and back. So, this system is already in place for big emergencies, and from my experience, it is clear where to go and where to find people” (S. Alzari, World Food Programme, 19 January 2015).

This dynamic was different for the V&TCs because the lack of coordination in the field meant that the DHN had to rely on the UNOCHA to make introductions on their behalf and then include DHN’s coordinators brokering the collaborations. The interviewees generally agreed that once swift trust was established by a UNOCHA or DHN coordinator, the HROs usually committed to the ‘collaborative spirit’ of the relationship. This meant that the HROs were open to allowing the V&TCs to establish joint routines and ways of working together. However, it also kept them open to pursue unilateral resolutions to their technical problems.

Although the collaborations’ time horizon was short, the actors would be assured of each other’s commitments when they acted reciprocally. This meant that the V&TCs would be expected to leverage their capacities in favor of the HRO’s agenda. At the same time, the HROs would, in turn, afford them greater access to conversations being had in the field, especially the basecamps.

“HOT is more deliberate now about developing software. If they must find an organization they want to work with, they may have to develop a more bilateral partnership. Most collaborations come from being at the same place with other people and develop the trust that way” (L. Hughes, personal communication, 15 December 2016).

The V&TCs’ collaborations’ point was to bring many methods that involve GIS, social media, crowdsourcing, software development, and several other capacities to the HROs. However, despite the potential of these, HROs continued to debate

the inclusion and representation of such data in their information management flow as they tended to be problematic to incorporate:

“Thus far, despite admirable efforts of DHN to connect the V&TCs and HROs and bridge the technical divide, there is little evidence as to the success of this endeavor. The web-based interfaces tend to be the most troublesome because the data from those may have special protections and most activating organizations may know very little about data privacy guidelines” (P. Meier, personal communication, 21 January 2016).

Despite the outward openness shown by HROs towards new ICTs, there was an overriding fear of the repercussions of outsourcing data collection and the consequences of using data sourced from social media platforms. In the earlier days of the collaborations, trust, reliability, and technical consistency often arose in utilizing data from an open-source (P. Hernusi, personal communication, 29 November 2015; A. Verity, personal communication, 9 December 2016). These issues led to slow cooperation in information sharing following the 2010 Haiti earthquake and were still not addressed in 2015 when another earthquake struck Nepal. Had it not been for the Kathmandu Living Labs’ convenience, a local entity that took on a facilitative role, it is possible that the HROs and V&TCs might have fallen out of each other’s favor sooner. Essentially, the UN Cluster System allowed cross-organizational information sharing between HROs and their traditional partners but was more complicated when they attempted to do so with the V&TCs due to the open nature of the data (N. Horning, personal communication, 19 November 2015).

Additionally, the leaderless structure of the DHN showed varied results among the V&TCs as many were unable to manage their collaborations themselves. These contributed to the growing tension among professional humanitarians in the field. Many interviewees, especially members from the HROs’ network, suggested that the formalization of the DHN could ease the commitment issues. *‘Formalization could open channels for funding and improve the credibility of V&TCs’* (Y. Link, personal communication, 4 November 2015; R. Moore, personal communication, 15 February 2016; Moore, 2016c).

Since the DHN was a leaderless umbrella group coordinated by an annually rotating body of four volunteers, their role was different from the UNOCHA coordinators. They had to be more representative of all the V&TCs. Rather than fulfilling the facilitative leadership role like the UNOCHA, the DHN’s role to the HROs was advisory. The result was that the collaborations were poorly managed because the DHN could not act with authority. At the same time, UNOCHA were too often busy coordinating the existing informational workings in the field. Additionally, the

DHN coordinators could not manage collaborations effectively unless vetted by a UNOCHA member. This led to significant questions about the predictability of the DHN and its ability to represent the V&TCs.

“The folks at OCHA have been great, but sadly It hasn’t been enough... clearly, DHN needs to rethink its strategy. I think what it needs is to build its legitimacy at the local level, rather than rely on formal organizations for support” (K. Chapman, personal communication, 17 November 2015).

The keyword here is ‘predictability’... While the HROs were generally committed to collaborating in an ad-hoc fashion, the level of their commitment varied. Earlier, knowledge about the V&TCs’ capacities was frequently misunderstood or nonexistent among the HROs. This lack of understanding about how those technologies and methods could benefit existing information management flows [via the V&TCs] led to fewer uses by the HROs.

“I feel quite frustrated that the whole ‘crisis mapping’ community has had little movement forward... These conversations where people say, ‘I have developed an app where you can take a picture of a house and upload it on a map—that’s not enough... If you want to link with some large bureaucracies, you need to have a predictable-high-quality product that they want” (L. Nissen, personal communication, 4 December 2015).

Essentially, the levels of commitment remained inconsistent due to a lack of preparedness within both parties. While some of that was due to the changing context regarding the roles of V&TCs in disasters, a lack of preparation to collaborate was a fundamental challenge. Principle concerns revolved around prior awareness of the V&TCs, and the extent of their capabilities, and their legal standing. Although awareness of the benefits of crowdsourced crisis mapping data had increased, the inter-organizational structures between the HROs and V&TCs did not improve.

“DHN requires too much time to explain the formal processes in which they are expected to provide support. The IMOs—information [management] officers have a hard time capitalizing on the work they produce. For example, in Nepal, we were missing a contextual understanding of how DHN can help us... we do not just collect information for the sake of it. We do it to make decisions, and that means knowing what needs attention in a time-sensitive environment” (J. O’Callaghan. personal communication, 24 November 2015).

The Nepal earthquake response was a watershed moment that highlighted some successful collaborations that involved the V&TCs. However, it also highlighted the significant lack of understanding on how to apply their contributions. For instance,

Meier (personal communication, 21 January 2016) explained that following the Nepal earthquake, the ‘failure’ of crowdsourced maps to be utilized was deliberately not advertised so that the digital volunteers that had dedicated so much of their time would not be disheartened.

By the Spring of 2016, some V&TC’s were discussing how to provide crowdsourced crisis maps directly to governments rather than to the HROs. Additionally, commitments from both sides were motivated by different factors. On the one hand, the HROs seemed to be economically oriented, revealing significant technical issues that were neglected until the UNOCHA outlined to the IASC the urgency of updating information management capabilities across the humanitarian aid sector. On the other hand, the V&TCs were motivated by their desire to revolutionize the way humanitarian affairs were organized and possibly shift it to a more horizontal distribution of actors. From these two perspectives, it is clear that the HROs and V&TCs were unlikely to overcome these motivations without the help of the DHN, which in turn could not instantiate the HROs to commit to collaborate without the help of the UNOCHA. Thus, both could not possibly engage each other effectively until the tech and management gaps were addressed in unison. As Patrick Meier highlighted, “this is a human story, not just a technical one” (P. Meier, personal communication, 21 January 2016).

5.5.3.a. Mutual recognition of interdependence

At the time of the research, the HROs and V&TCs struggled to achieve interdependence. When asked to describe the relationship between HROs and V&TCs, most interviewees referred to their relations as ‘ad-hoc,’ meaning low-risk and low commitment. *Mutual recognition of interdependence* typically occurs when two or more actors share in the opportunities and constraints that shape the prevailing environmental factors, e.g., economic, social, political, and environmental conditions (Watson, 1995). This was not the case with the HROs and V&TCs, as several organizational challenges were described in reports containing discussions about their collaborations⁶. These reinforced the fact that in 2015, the HROs and V&TCs were no closer to achieving interdependence than at the founding of the DHN in 2012. It represents an apparent failure to achieve a positive Collaborative Outcome. This will be further explained in section 5.6.

The work of Van Gorp (2014) was the first body of knowledge to outline the challenges to the V&TCs’ integration: (1) limited resources; (2) the management

6 See <http://digitalhumanitarians.com/> Last accessed February 6, 2017.

See <http://digitalhumanitarians.com/page/activation-diagram> Last accessed February 6, 2017.

See <http://digitalhumanitarians.com/page/interaction-diagram> Last accessed February 6, 2017.

See <http://humanityroad.org/aboutus/> Last accessed February 6, 2017.

See <http://ict4peace.org/> Last accessed February 6, 2017.

of digital volunteers; (3) different levels of engagement; (4) informal methods of achieving success; (5) different levels of commitment and (6) HROs' risk aversion approach to dealing with non-UN entities in informational matters. These challenges were revisited in this study, as they endured despite years of collaborative experience between the HROs and V&TCs. By 2015, Van Gorps' identified challenges to the interdependence between HROs and V&TCs remained mostly unchanged.

The first challenge: While the limited availability of resources by HROs could be a factor favoring collaboration, neither the HROs nor the V&TCs could effectively manage their collaborations without the support of the UNOCHA and DHN. For instance, the staffing of the V&TCs had remained a significant issue well into 2016. As indicated by Liz Hughes, V&TCs lacked the human resources needed to sustain 24/7 operations. (L. Hughes, MapAction, 15 December 2015). Indeed, the V&TCs were never designed to sustain intensive information management capacities in intense humanitarian deployments.

The second challenge: digital volunteers' management presented challenges both for the V&TC internally and between the collaborating actors. For instance, Patrick Meier (16 January 2016) indicated that typically only 20% of a digital volunteer base was active during significant disasters. This led to instances where V&TCs did not have enough available volunteers and left active volunteers subject to burnout from heavy workloads. Finding skilled volunteers was also challenging as the gap between knowledge and UN bureaucracy were almost two different languages that few people wanted to translate outside the core DHN coordination group. For example:

"V&TCs do not always understand humanitarian principles including neutrality, impartiality and independence, and the extent to which these terms define their accountability is unclear" (L.Capelo, personal communication, 16 January 2016).

The third challenge concerned the HROs' need for risk-free collaborations. Van Gorp (2014) stated that when an initial commitment to collaborate has been made, a 'problem-setting' phase occurs between two actors. They legitimize the stakes and recognize that they share a joint problem or issue. In establishing relationships with V&TCs, HROs needed to know in what specific ways the V&TCs could improve their information management capacities and according to the HROs individual agendas. However, this was never clear, even with the establishment of the DHN. Simultaneously, the only metric that HROs had for the V&TCs has sensationalized reports of their successes, which appeared to be too few and far between the three years that the DHN had been attempting to facilitate collaborations.

“To date, the efforts of the digital volunteers have remained on the periphery of the humanitarian aid sector. They just are not funded at all, and that makes them unattractive to organizations like the WHO. I know there is an agenda now to drive the collaborations out of the headquarters, away from the desks of people that work on the back-end, and out to the field teams.” (E. Diggle, personal communication, 27 January 2017).

Suppose V&TCs had been able to guarantee the improvement of specific information management flows or processes. In that case, these might have garnered some donor attention, and probably there would have been a more significant effort to integrate them.

The fourth challenge concerned the different levels of engagement among HROs and V&TCs. HROs tend to have a broader view of the operational response, including the logistical challenges and budgetary constraints. V&TCs, however, tended to be focused on enabling citizens to help each other through digital media. There were tensions between engagement, activity, and priorities between the different actors due to these differences.

“With voluntary organizations [V&TCs], it is difficult to instill work ethics and manage them because people are doing it in their own time. There aren’t many individuals that are prepared to give as much as it takes... and you can’t ask people to work 20-22-hour days during disasters, show up for meetings, etc., all on top of ordinary day jobs they may have elsewhere” (H. Leson, personal communication, 2015).

The fifth challenge concerned the different ways of working between V&TCs and HROs. While the HROs worked in hierarchies, V&TCs had flattened, decentralized structures. This was problematic because it meant that because the V&TCs were more flattened and therefore less rigorous in terms of their accountability, any costs incurred by the HROs would not be borne equally by the V&TCs. As Provan stated, unequal representation of the risks and opportunities often result in lower levels of collaborative performance (Provan, 1993). The sixth challenge: V&TCs do not yet have well-established networks, and the information flow between them and the HROs is limited.

“I have researchers in my department who are aware that when HROs extract indigenous knowledge, it winds up being reported and talked about but never makes its way to the V&TCs or local NGOs where it might be useful. There is this frustration with the HROs in Africa that they don’t have good information management flows that work both ways. This can manifest into all kinds of

problems, like turning away opportunities to collaborate or restricting access to local populations” (H. Milton, personal communication, 20 October 2015).

The adversity to achieving interdependence stemmed from a lack of motivation to work with V&TCs. They became intertwined with risk mitigation, assuming that the information officers were more responsible for mitigating collateral damage to their organizations than finding innovative ways to address technical gaps in information management. Several interviewees did not care for the term ‘failure’ when referring to the collaborative efforts with V&TCs. Failure was often referred to as “it,” a kind of taboo around the workplace. Consequently, the FIS staff were reluctant to take on more work than they could manage with the V&TCs as a means of minimizing the risk to the UNOCHA. This was a point most frequently discussed at mealtime and after-hours occasions. Those conversations often involved work-related complaints about the overflow of projects intersecting with multiple partners in a rigmarole of meetings, paperwork, and time spent defining objectives. In contrast, the actual work slowed in the absence of effective management over the Collaborative Process.

“It most probably happens [failure] often, or they [whoever is in charge] know it happens, but it does not disrupt our operations to a point where the organization is at risk of losing face” (H. Milton, personal communication, 20 October 2015).

The interviewees’ collective response and the researcher’s own experience leads us to believe that there was no credible evidence that the HROs recognized any interdependence between themselves and the V&TCs (outside of the UNOCHA and DHN specifically). Interdependence in collaborative networks is supposed to be reciprocal, while in dyadic relationships, interdependence is pooled (Thompson, 1967). In the case of the HROs and V&TCs, both networks depended on the UNOCHA/DHN coordination network’s dyadic relationships. Therefore, interdependence was not achieved at the organizational level but rather at the micro – or – personal level between the actual coordination staff brokering the collaborations.

5.5.3.b. Shared Ownership of the Process: Managing Preparedness

According to Ansell and Gash (2008), Shared Ownership is a frame of mind that the actors must achieve through good faith bargaining. It implied the shared responsibility for the Collaborative Process’ management and meant that actors fully accept each other’s roles and share the burden of management and its risks. This part of the Commitment to the Process is interesting because technically, it was supposed to be the HROs’ responsibility to instantiate collaboration with a request. However, the V&TCs were expected to shoulder the burden of

management while also conforming to the HROs informational needs in-line with their agendas. This situation is curious because neither the HROs nor the V&TCs were prepared to manage their collaborations constructively. Most interviewees agreed that preparedness to collaborate was lacking because there was not enough predictability to establish a better sense of owning the management process on both sides. As Ken Meesters recalled regarding the sharing of the Collaborative Processes' management:

"We need to move away from the current adhococracy and invest in new processes that allow HROs to outsource their work openly. This is the moment we can jump in and own a part of that process by having somebody monitoring how this works" (K. Meesters, personal communication, 13 November 2015).

At the same time, the HROs have been prompted by the IASC to explore how to incentivize collaborative networks to expand their informational capacities, including making V&TCs and other potential partners feel like they have some stake in humanitarian aid. For example, the "Agenda for Humanity" is a United Nations call to "refocus on ending the competitive culture of the humanitarian sector and commit to a new paradigm... of important transformations" (World Humanitarian Summit, 2016, p. 8). Simon Alzari also explained that the competitive nature greatly influenced the lack of shared ownership in collaborations and isolated siloes of information management, which is considered standard among the HROs.

"I have been in South Sudan and Iraq, and I can tell you that the biggest problem is always information management, as it is not seen as a strategic asset. It is very complicated for the information officer to retrieve the relevant information, transfer it to the head-office, structure it and update it for the field teams." (S. Alzari, personal communication, 19 January 2015).

The limits that manifested on the HROs in terms of how they conducted information management made it difficult to plan long-term partnerships. On the one hand, the HROs were being directed by the IASC to pool informational resources from prospective humanitarian contributors (mainly other NGOs and non-profits). At the same time, they faced significant funding pressures forcing the HROs to think defensively. Under these circumstances, imparting shared ownership over the Collaborative Process was quite tricky. The HROs could not share the risks and opportunities equally with any potential partner due to their vulnerability.

"While the traditional means for distributing control is through subordinates in hierarchies, it is increasingly apparent that hierarchical organizations in crisis management face new challenges... When that complexity exceeds the

capacity and understanding of individual leaders at the top, tasks cannot be performed effectively” (W. Burgh, personal communication, 11 August 2015).

Typically, successful collaborations in any other setting occur because two or more parties share the risks and benefits equally. However, the Collaborative Process between HROs and V&TCs was unbalanced precisely because there was confusion over responsibility and because the risks were not shared. In this context, Andrej and his colleagues concluded that the more times that UNOCHA and DHN coordinators could meet to discuss preparedness (outside of emergency timescales), the more they would develop the newer coordination network to bracket the risks and uncertainties of both sides. Therefore the goal of the UNOCHA and DHN in 2015 was to preserve the successful parts of the HRO/V&TC relationship, e.g., the small hub of UNOCHA/DHN coordinators composed of Andrej and his colleagues. This entailed facilitating creating a shared space wherein UNOCHA, and DHN coordinators could introduce their other humanitarian professionals and representatives to the V&TCs outside the United Nations’ auspices.

5.5.3.c. Openness to Exploring Mutual Gains

A long-term partnership between the HROs and the V&TCs required a permanent interface—a set of protocols for governing flows of data and different ways of thinking about decision-making, problem-solving, and conflict resolution. With this in mind, the HROs and V&TCs did have an openness to exploring mutual gains through technical means but less so for creating the interoperability of their management. Instead, they reinforced the ambiguity revolving around the V&TCs’ sense of belonging or having a stake in humanitarian aid. For instance, interviewees expressed strong support for an ‘API for the UN,’ which was initially discussed at the 2010 Crisis Mappers Conference in Boston (A. Tapia, personal communication, 15 August 2015).

The notion being that the UN should somehow work with the V&TCs to establish a standard set of protocols to connect their people, workflows, and data flows but not their integration. In this way, the HROs would not need to worry about reform by introducing the V&TCs as formal partners. Simultaneously, the V&TCs could remain less structured and not fear ostracizing some of their members who could not become professional humanitarians. Thus in 2015, all indications showed that some HROs: the UNOCHA, IFRC, WHO, and WFP, were interested in exploring such ideas, albeit without formal support.

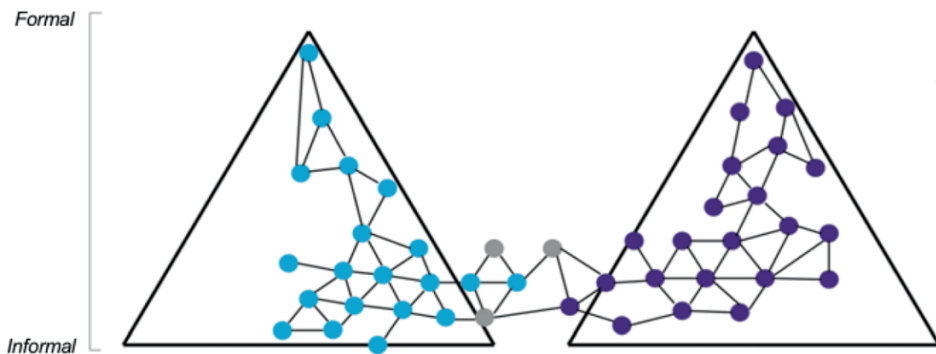
“What is UNOCHA’s actual relationship to DHN? Is there anything formal here? I’m not even sure that there is. Andrej has worked on a connection, and that’s great, but that’s his project. I think ‘OCHA’ is generally supportive of the

idea-- but I am not aware that there is an institutional framework around it.”
(C. Hendricks, personal communication, 26 November 2015).

It was expected at the DHN's founding that HROs and V&TCs would naturally come together and comingle into new working arrangements. Unfortunately, this was not the case, as the HROs lack of bandwidth often led to more collaborative failures than successful ones. The responsibility to explore the mutual gains between the two networks lay with the DHN, which relied on UNOCHA to collaborate with the HROs. Thus, UNOCHA and DHN did strive to explore their mutual gains for collaborating, albeit to form an ‘informal’ humanitarian space where HROs could outsource their information needs—a bazaar of technology and talent.

A sense of common purpose and commitment was generally scarce as only the most recognized and successful coordinators. For instance, many of the information products produced by the V&TCs were generated without a specific request. Thus the information flow between them and the collaborating HRO was initiated from the bottom-up. This was the most natural way for coordinators to establish dialogue and troubleshoot problems, but it also limited the scope and application of the products themselves. Figure 16 represents how the information management flows existed and how they were connected between the HROs and V&TCs.

Figure 16: Bottom-up information management flows



Adapted from: Hunt and Specht, 2016

The figure is adapted from Hunt and Sprecht (2016), who also followed the implications of collaboration failure between V&TCs and other formal organizations at the time of the research. However, where they focus on the gap between formal and informal information pathways, their illustration also serves our analytical purposes to explain elements that they have not. For instance, the figure shows a bottom-up approach to collaboration and knowledge transfer that only existed

in narrow information channels. However, what is not shown is that each node in the figure was a collaboration that temporarily enabled two-way communication.

From the bottom-up approach, coordinators such as Helen Campbell or Roxanne Moore managed the collaborations directly. They enabled a two way, albeit narrow channel of information that could trickle into the formal information channels of the HROs, e.g., via a FIS bound team managing a collaboration for mapping infrastructure damage in Nepal 2015 between the UNHCR and the QuakeMap team. Because of this narrow channel, the volume of data flowing through these pathways once again overwhelmed the few people facilitating these channels. Because of this, UNOCHA and DHN coordinators were prone to burnout, and many information products produced by the V&TCs ended being ignored or poorly integrated into the traditional information management flows of the HROs.

These are consistent with our findings of an informal coordination network wedged between the networks of HROs and V&TCs. Much of the crowdsourced data collected during moments of crisis did not get processed directly, and the V&TCs central role in the collaborations involved processing and codifying this information. However, these same activities only occurred successfully if overseen by a coordinator. This is consistent with Ansell and Gash's (2008) assertion that actors that perform collaboration poorly need a third party to help them work out their differences.

"It's about having appropriate processes that can harness the capacity of ICT, of making sure human resources have the appropriate competencies, that they are aware of how to use technology, and how it can play an important role. I think if people keep jumping to the tool or the technology as the solution, we will not move forward" (B. McDonald, In "Disaster Relief 2.0", p. 45).

At the time, the most recognizable metrics of a successful collaboration were the production of generic information products themselves. Those were most often mapping, massive excel sheets, or other datasets about the crowdsourced material, as well as new dashboards and smart-phone apps for keeping track of the HROs and their activities. By the Spring of 2016, there were so many of these products that it was hard for information officers to keep up or find a use for them:

"It is not fair to say they're not successful because they tried their best, but they just couldn't get the right data. In the end, everything depends on how much useful data there is." (P. Hernusi, personal communication, 29 November 2015).

There were also more specialized products generated by the V&TCs, such as event diaries, in which specific information such as location and capacities of nearby

hospitals are synthesized during disasters. For using such specialized products, the requesting HRO had to be educated by the providing V&TCs on the use of such event diaries and how they could add value to ongoing operations. This meant the ‘articulation’ of added value, which was usually left to the DHN coordinators to manage. While most interviewees acknowledged that resource constraints and a lack of knowledge on how to incorporate those data were a significant impediment to accepting the V&TCs’ capacities, they agreed to explore better ways of utilizing those capacities within the context of the local needs of the aid beneficiaries. One successful

“The Nepal response was one of the few times where a physical hub was established that UN teams could make specific information requests through the Kathmandu Living Labs. KLL was a locally based entity, so the people there were all familiar with the local lingo and were highly skilled technicians. So, through KLL, the DHN suddenly had an influx of people that understood the needs on the ground and how to plug in both humanitarian professionals and digital volunteers” (E. Kaslander, personal communication, 17 November 2015).

For example, during the Nepal response in 2015, the Kathmandu Living Labs, a local organization, became an integral part of the Nepalese response. Its performance working with both the HROs and the V&TCs, via the DHN illustrated the need for more hubs deployed regionally. Although the networks that connect humanitarians did expand briefly during the deployment, this was a crucial but temporary influx of individuals that could assist with add-value articulation in the basecamps. Responders are increasingly struggling to handle a growing amount of data arriving more quickly than ever before.

“There is always a difficulty with information management no matter how much tech you throw at it. You are not going to solve it until you agree with people to use a common system ... data management and data visualizations are very attractive to every group that I've worked with — it provides incredible assistance with decision making before and after a disaster” (T. Doyle, personal communication, October 18, 2015).

Essentially, there was openness to exploring what the HROs and V&TCs can achieve together. However, high expectations marred these due to the hype around ‘humanitarian innovation’ and understanding how to effectively apply crowdsourcing capacities. In one interview, Per Aarvik, Vice President of DHN, expressed his concern with misleading expectations:

One challenge is the expectation that we can harvest everything ... we met that frustration during Nepal when the flow of information in social media was so

massive that some interpreted it as if we could make a full damage assessment on Nepal based on those social media messages, which was not valid. (personal communication, November 20, 2017).

As mentioned earlier, the Collaborative Process facilitators can only manage it for a limited time before leaving the two participants to figure out the nature of their collaboration themselves. This led to misunderstandings and frustrations on both sides regarding the nature of the relationship. On the one hand, the HROs believed they were dealing with a procured resource. On the other hand, the V&TCs believed are dealing with a partner. Despite the challenges associated with misunderstandings and expectations, there have been efforts to generate a shared understanding of each participants' needs and work processes.

5.5.4. Shared Understanding

The development of *Shared Understanding* is part of a more extensive collaborative learning process to assess the extent of the collective learning that results from actors interacting with each other. Therefore, *Shared Understanding* is composed of defining a clear mission among the stakeholders, defining an apparent problem (that they face together), and identifying shared values. The UNOCHA and the DHN had been collaborating for several years before the researcher's secondment. In that time, they had learned much from each other despite the apparent challenges. Prior studies on Collaborative Governance have emphasized that shared understanding is a crucial factor influencing collaboration between organizations (Ansell and Gash, 2008; Bentrup, 2001; Emerson, Nabatchi, and Balogh, 2012).

5.5.4.a. Defining a Clear Mission: Reliability and Predictability

In developing collaborations with V&TCs, reliability and predictability became recurring issues for the HROs. Before a deployment, HROs desired a clear understanding of the services and products that the V&TCs had to offer. Some V&TCs had direct contributions, while others were less explicit of their services. The latter approach was more common as they often struggled to articulate the added value of their capabilities during the early phase of a disaster. The ambiguity among some V&TCs was often explained as 'flexibility' among the V&TCs, in line with the fluid nature of humanitarian deployments under the UN Cluster System framework. Meaning that the V&TCs saw their mission as better served by first waiting to see what problems the HROs were dealing with and then develop solutions to those problems rather than have preset services/products ready for use.

On the other hand, the HROs interpreted that flexibility as a lack of reliability. Several interviewees expressed dissatisfaction regarding recurrent conversations on defining what HROs and V&TCs can achieve together. For example, the

StandbyTaskForce is a V&TC well known by HROs, yet their attempts to define a singular mission with them have been a challenge. As stated by Luis Capelo:

“SBTF leaders often had several conversations with formal organizations [HROs] that wanted to work with them and define clearly in what activities they can work. Often the conversation went to refining what is expected out of the volunteers’ work... what generally happened is that the conversation stopped. They could not go forward” (personal communication, 16 January 2016).

The characteristics of each collaboration varied based on the requesting organization’s needs and the capacities required. For instance, data availability, accessibility to resources, requests for analysis, language, subject-matter expertise, and the ability to partner with local networks were characteristics that placed varying demands and pressures on the V&TCs. Additionally, confidentiality and security were critical factors that influenced how a ‘mission’ to collaborate was defined. Often, humanitarian professionals were not well informed on the strengths and limits of V&TCs and often mistook them for a professional outfit contracted by their organization to perform very complex tasks on short notice:

“The projects were not always clear and realistic in what they seek to achieve or address and how they go about it. Conversations and interactions need to be framed so that all those involved know what they are getting into. There is much frustration around the perception of V&TC’s consisting of superwomen and supermen, able to deliver anything” (S. Hattotuwa, personal communication, 2013).

For the HROs, professionalism was a culture that meant delivering consistent and accurate services when called to perform. Although much of the V&TCs remained fluid in their commitment to humanitarian deployments, some V&TCs had adopted a professional mentality. MapAction, for example, was a right partner in dozens of collaborations and engaged in monthly training exercises with its volunteers since its inception, certifying everyone’s capability on its team. Such organizational maturity resulted from the frequent interface with professional humanitarians and a desire to be recognized as a stakeholder of humanitarian aid.

“OSM is oriented to building a fully open map of the world and must therefore ensure that data that gets input into the map has clear licensing. This perspective makes OSM more purist than other V&TCs” (K. Chapman, Humanitarian OpenStreetMap Team, November 2015).

As stated, not all V&TCs were able to formalize like MapAction, and this was a significant influence in their lack of ability to define a clear mission for collaboration

with HRO. Some efforts were made to recognize how they could inspire new forms of disaster sensemaking without becoming heavily invested in organizational reforms. For instance, the World Food Programme had become aware of the capacities available from the V&TCs. It began establishing its innovation centers and training programs to incorporate digital volunteers directly into its operations.

“The four information officers that sit within the World Food Programme have developed very different roles and capacities from some of the other clusters [HROs]. We are doing a very good job in leading the capacity [information management] towards new technologies. With the technological shift occurring throughout the sector, we are also using social media to gather information in areas where there is no international presence” (S. Alzari, personal communication, 19 January 2015).

With some exceptions, the failure to define a clear mission had been ongoing since the UNOCHA and DHN first began collaborating in 2012. This problem was a two-way street: on the one hand, the V&TCs have had difficulty defining their role within humanitarian aid and the services/products they can bring to the table. On the other hand, the UN Cluster System’s nature—decentralized from any enforcement mechanism to compel coordination—narrowed the HROs’ bandwidth for collaboration with V&TCs. In turn, this reinforced the HRO’s assumption that any actor working in the humanitarian field was inherently like them. According to the United Nations mandates, the burden of service management lay in all other actors.

The role of the HROs was to lead the coordination of activities of each sector of the UN Cluster System, not to manage the individual projects of each organization that appeared in the field. Therefore, HROs were often preoccupied with juggling between coordinating logistics, information management, and mitigating risk to their organization’s credibility. The shared understanding between the HROs and V&TCs suffered due to unpreparedness to define a clear mission together and not compromise their different visions of what collaboration was supposed to accomplish.

5.5.4.b. Common Problem Definition: The Technical Gap

Collaboration is typically initiated because of a perceived environmental threat or a new legal mandate (Emerson, Nabatchi, and Balogh, 2012). When an initial commitment to collaborate has been made, a ‘problem-setting’ phase occurs when groups with legitimate stakes are identified. The joint problem’s nature is articulated (Gray, 1989; Huxham et al., 2000). This problem-solving phase involves consensus on the problematization of their past failures. Such consensus was crucial and consisted of framing a common problem that can align the HROs and V&TCs together as a springboard to action. However, as Heather Milton from GISCorps

stated, the facilitation of collaboration wasn't enough to problematize why they should come together.

"I can't say that the 'middle layer' of facilitated outsourcing has been effective... But I can say that it has helped us to push forward our capacities. For instance, the Humanitarian OpenStreetMap Team lead to some good dialogue with information officers in the past, but the broader cluster community [other humanitarian professionals] struggle to plug in those capacities. So, I think there might be something they are missing" (H. Milton, personal communication, 20 October 2015).

In 2015, there still was a lingering lack of contextual understanding about the use of crowdsourcing and big data in disasters by the HROs. Similarly, misunderstandings by the V&TCs persisted regarding the socio-cultural and geographic context of humanitarian deployments and the types and scales of processes for addressing them. For example, the 2016 Ecuador earthquake and the 2015 Nepal earthquake both attracted many V&TCs. However, despite some similarities in the crisis type, integrating crowdsourced data in the response varied relief chain.

Several interviewees (A. Verity, Y. Link, N. Horning, L. Capelo, R. Moore, H. Leson, H. Campbell, personal communications, 2015) had previously performed troubleshooting outsourced problems to V&TCs of Crisis Mappers or OpenStreetMap. However, the departure of these troubleshooters in 2016 was very disruptive and stopped the positive dynamics that had only just begun to alleviate the failures thus far mentioned. Ken Meesters described his experiences in the role of a neutral troubleshooter:

"There is quite a disconnect between people within the HROs and the DHN on what was happening in the field. The people motivate themselves and convince themselves of the work's value versus the field's actual needs. When I went to the Philippines and Nepal, the information products the V&TCs were producing seemed to be buried in a pile. People didn't need them or don't know how to use them--it's not on the radar" (K. Meesters, personal communication, 13 November 2015).

While aspects of visibility, competition, and donor accountability play an important role, many independent (and often small) projects tended to neglect the feedback cycle regarding initiated, completed, or abandoned collaborations. Ostrom (1990) pointed out that actors who share a common resource must understand what those are and who owns them. When the technical gaps in the HROs started to show in Haiti in 2010, it took an unnecessarily long time before they were identified. Liz Hughes explained that although there had been some effort forward fueling

more feedback from the HROs to the V&TCs over the years, the nature of the HROs collaborations was so tied to the field that post-disaster feedback between traditional actors was uncommon.

“Organizational differences are always an issue because we are dealing with a system that is entrenched in old ways of thinking and is slow to change. However, there is a growing effort to build resilience for humanitarian coordination. Most partnerships come out of being at the same place with people at the same time” (L. Hughes, personal communication, 9 December 2015).

Most interviews felt that the Collaborative Process was generally cordial, but afterward, there was little follow-up on how to improve their interface for future work. For instance, the DHN served a questionnaire to the collaborating participants at the close of each collaboration. However, few HROs took the time to fill it out or give feedback unless directly requested by the coordinator—several interviewees (A. Verity, personal communication, 3 November 2015; H. Milton, personal communication, 20 October 2015; R. Moore, personal communication, 9 December 2016; E Diggle, personal communication, 27 January 2017; G. Wood, personal communication, 18 February 2017) generally agreed that feedback loops between the HROs and V&TCs were necessary. Still, up to 2016, a fixed process for achieving that problematization had not materialized.

The attitude among the HROs towards the V&TCs contributions was a mixture of exacerbation and interest. By the Nepal 2015 response, the humanitarian field had been flooded with technologists and what one interviewee called ‘part-time humanitarians’ seeking to test-bed their ideas. The overabundance of new software, new apps, and new maps had become so persistent that towards the end of 2015, it became common to disregard the contributions of the V&TCs in impact reporting.

“In my experience with DHN, the traditional entities have been great. The impact evaluation is crucial as well, and this is where we can make the most progress. However, the worst is when the volunteers don’t know what came out of it” (N. Chang, personal communication, personal communication, 2013).

Through the UNOCHA and DHN coordinators’ intervention, the HROs and V&TCs slowly began a process of demystifying their shared knowledge about the technical and management problems facing their collaborations. The UNOCHA and DHN coordinators helped establish several activities and events where members from both networks could pool their different interpretations to arrive at a common understanding of the value of crowdsourcing, crisis-mapping, software development, and other V&TC capacities.

The DHN had also made a concerted effort between 2014-2015 to ensure their communication lines would be more accessible, taking on more coordinators and training others to fill the same role without being coordinators themselves. In this way, the HROs could request feedback more regularly to articulate what the V&TCs can in the context of collaboration. Similarly, feedback had to be available for the V&TCs, as the act of giving feedback was resource-intensive for HROs, and often exacerbated the lack of a common problem definition between the two networks. Over time this improved, especially in the UNOCHA and in some of its counterparts such as WFP and IOM. However, HROs were largely disinclined to troubleshoot too much unless an outside organization or institution was willing to organize such activities through dedicated research. This was tied to the HROs lack of incentives and institutional deterrents to spend resources on V&TCs when their added value was questionable and the general view that their relationship to them was experimental.

“One of the failings from our situation is that we have not consolidated our learning... We have not done case studies and celebrated the successes effectively... that is something we look to do in the future” (E. Diggle, personal communication, 27 January 2017).

Traditionally, evaluations on how HROs and V&TCs perform during a disaster focus on lessons learned but rarely translate into actions. Instead, they leave the lessons identified with no resulting plan to turn those insights into revised tools, practices, and policies. Despite these failings, HROs and V&TCs agree on exploring alternatives for increasing impact, visibility, and access to populations affected by disasters. It is the plight of disaster-affected people that unites them in their efforts.

5.5.4.c. Identification of Common Values

Identification of common values implies the ‘alignment of core values’ (Heikkila and Gerlak, 2005). ‘shared ideology’ (Waage, 2001), and the ‘common purpose’ (Tett, Crowther, and O’Hara, 2003) that actors must attain from both problematizing the issue at hand, and by defining a clear mission for addressing the said issue. The HROs and V&TCs had several values that paralleled one another. For instance, the view that all the HROs’ activities should always be oriented towards disaster-affected people parallels the DHN’s philosophy for public self-organization against crises. Both HROs and V&TCs share the philosophy of service to people in need. So, among the V&TCs, the dominating rhetoric for collaboration avoids clashing with their HRO counterparts’ ideological motivations.

As Ostrom (1990, 2001) pointed out, a shared long-term vision is necessary to bring different actors together. The HROs collectively recognized that “how people interact will change with or without their sanction. Either those organizations will

adapt to the network age, or they will grow increasingly out of touch with the people they were established to serve” (United Nations Office for the Coordination of Humanitarian Affairs, 2013, p. 7). On the other hand, the DHN are aware that they need to scale up their ability to guide HROs toward understanding how they can best make use of the capacities that V&TCs have offered.

“I think this effort is one of a kind in terms of formalizing the commitment to support the information management services. What is specifically required is for an outside person to come in and monitor what is required” (A. Warsame, personal communication, 26 January 2017).

During the research, several meetings discussed the need to make the V&TCs’ capacities more applicable to the field—meaning useful for working in the basecamps or ground level. For example, in the Nepal earthquake, Humanity Road had tapped Standby Task Force (SBTF) to export the crisis-mapping product QuakeMap for UNOCHA earlier in the response. The process included converting traditionally collected data (via a FIS team collaborating with the UNHCR information cluster and the Kathmandu Living Labs) into usable reports. A map only understood by a few GIS experts sitting at a desk in Geneva was of little use when the primary responders come from the towns and villages affected by the disaster.

“There are a lot more people in the field, and there is lots of turnovers—people who temporarily take on the role of an information manager or coordinator and leave little reference for the next person filling the role. That hinders much progress made over the years. The field presence is required if only because people automatically keep within their circles. This is part of why most UN staff don’t find V&TCs very interesting” (K. Meesters, personal communication, 13 November 2015).

The modern information technologies in use by the DHN also impact the philosophy of humanitarian principles. In the words of Sir Berners-Lee⁷, “information technologies enable better data integration by allowing everyone who puts individual items of data on the Web to link them with other pieces of data using a standard format.”

The HROs knew about the ICTs that involve public participation already in 2010, yet there had not been a standardized use presented for those tools. The lack

7 Testimony of Sir Timothy Berners-Lee, CSAIL Decentralized Information Group Massachusetts Institute of Technology, Before the United States House of Representatives Committee on Energy and Commerce Subcommittee on Telecommunications and the Internet Hearing on the “Digital Future of the United States: Part I – The Future of the World Wide Web”, <http://dig.csail.mit.edu/2007/03/01-ushouse-future-of-the-web.html>.

of standardization in ICT tools and data processing was why the UNOCHA had considerable latitude from the IASC to continue its experiments with the DHN. It allowed a continued incremental process of technology adaptation while also avoiding significant reforms. However, this was unsustainable, and Andrej Verity and Helen Campbell called this approach the “half-in/half-out mentality” (A. Verity, personal communication, 9 December 2016; H. Campbell, personal communication, 18 November 2015).

“To realize the full potential of the V&TCs, it is imperative that we enter into the process as a committed partner and member of this community” (op cit, “Volunteer Technology Communities: Open Development, Global Facility for Disaster Reduction and Recovery,” GFDRR, n.d., p. 17).

The HROs need to adapt to the day’s technological demands, while conversely, V&TCs know they need help in formalizing themselves into full-fledged organizations. In 2015, much attention was focused on uplifting disaster-affected communities into their own ‘local’ organizations similar to the V&TCs following the Kathmandu Living Labs’ example in Nepal.

“During the Nepal Response, they [KLL] were the best-placed local organization to deal with everybody in the same place ... Oh, that was big -- I saw the deployment that they put up at the Ushahidi deployment, and it generated a huge reaction from the disaster responders. Suddenly everybody wanted to work with KLL because all tech-savvy locals coordinated everything between the Nepalese military, the aid organizations, and the digital volunteers all under one roof. It was great” (N. Horning, personal communication, 19 November 2015).

In the immediate aftermath of the Nepal earthquake, over 8,000 digital volunteer mappers of the *Humanitarian OpenStreetMap Team* (HOT) worldwide and the affected areas collectively created and updated online base maps and offline mobile or printable maps post-earthquake Nepal. Because these maps were open-source, any person or organization could download and use them for free. The post-earthquake maps were essential for international first responders to conduct their search and rescue operations.

The HROs and V&TC generally had shared common values, as evidenced by their history of cooperation and the hybridization of the coordination networks between the UNOCHA and DHN. Additionally, these have been used to foster the network’s growth independently between the HROs and V&TCs. Over time, these individuals would help align both camps’ core values and bring them closer together in a more formalized policy. This aligns with what Sabatier and Jenkins-Smith (1993) about

actors needing to develop a shared understanding of policy aims contingent upon both sides recognizing that they are compatible.

Unfortunately, in the case with the HROs and V&TCs, this had been mostly unsuccessful due to two institutional challenges:

1. The lack of standardization among the HROs concerning open-source data (social media sources, SMS, et cetera) into formal IM reporting procedures.
2. The inability of the DHN to expand its pool of coordinators, especially those that could have access to the field.

Without either of these, the *Collaborative Process*' outputs continued to be inconsistent well into 2016, with the steady reduction of willingness to collaborate from both sides.

5.5.5. Intermediate Outcomes

Intermediate outcomes represented the tangible outputs from the *Collaborative Process* that justified continued collaboration. Ansell and Gash (2008) called these *small wins* or actual products fed back into the *Collaborative Process*, encouraging *Trust Building and Commitment to the Process*. In the case of the UNOCHA and the DHN, these took the form of tools, platforms, or other innovations, e.g., HOT, AISDR, among many others, and remained in use beyond the activation process. The history of the innovations produced by the V&TCs will not be elaborated on because these have been extensively covered in other studies (See: Harvard Humanitarian Initiative, 2010; Starbird 2012; Crowley, 2013; Meier, 2015; Whipkey and Verity, 2015; Chernobrov, 2018). Instead, this section focuses on the *small wins*, *strategic plans*, and *Joint Fact-Finding* methods used to strengthen the relationship.

5.5.5.a. Small Wins

In the case of the HROs and V&TCs, these were represented in the *Collaborative Process*' tangible outputs that justified continued collaboration. As Ansell and Gash (2008) called them, these 'small wins' have yielded the informal adoption of various open collaboration tools that've been introduced by the V&TCs. Open collaboration tools are another essential means to facilitate collaboration between HROs and V&TCs. Over time, these tools' common usage should hypothetically change humanitarian affairs' culture to prioritize collective action over political ones. However, as Lars Nissen pointed out, technical adoption also implies philosophical reform concerning the management of information management flows that are unlikely to be changed:

"It's not surprising that people rely on their networks instead of promising innovations that V&TCs bring. During emergencies, most professional

humanitarians are under enormous pressure... and it's not easy to trust in new technology when the old ways—no matter how incomplete—are known to work enough to make the minimum reporting standards.” (L. Nissen, personal communication, 4 December 2015).

Although there isn't an official mandate to modernize the HROs with newer ICTs and management methods, there has been a slow and silent shift for more technical services. During the Nepal earthquake response, HROs and V&TCs adopted and used Skype, Slack, Google Doc, Hangout, the Humanitarian Data Exchange or 'HDX' (open data sharing platform), and GIS mapping tools V&TC such as MapAction and QuakeMap. Most interviewees emphasized the importance of adopting such applications and tools.

“Skype groups were a very active form of communication technology that was used to coordinate between formal and informal members in every response I've been a part of. At any given time, we are typically running between twenty to thirty different chat rooms in Skype to collaborate with various groups of people” (E. Kaslander, personal communication, 16 November 2015).

Similarly, the upgrade of information services began with prototype data management systems that prioritized for faster development. In October 2015, strategic response planning had begun discussions on aligning data policy with UNOCHA's experimentations in several new approaches that involved a mentoring program for digital volunteers. These also included several other HROs such as the WFP, WHO, and World Bank, which recognized the need to meet information service demands by implementing crowd-surfing training in the first 72 hours of a deployment.

“The World Bank surprised me... They supported the idea of the hackathon and sent me to Sydney, Australia to run a hackathon. The one organization that changed the most was the World Bank for me. OCHA was full of brilliance, of course... However, it was very heartwarming to see that another big-name agency was also up to the task” (H. Leson, personal communication, 2016).

Groundwork has been laid on several significant information technology challenges and introducing the next generation of field information services. For example, the *Humanitarian ID Initiative* had finished development before the researcher's secondment and was already being used to help the UNOCHA track deployed information officers. With this tool, any information cluster will view a list of deployed within the country's future deployments.

“Humanitarian ID came out of the challenge we faced in not having a contact list of deployed personnel. In the Philippines, we had thousands of responders coming and going and no way to track what they were doing during hurricane Yolanda. So, what we are doing with this tool is managing humanitarian contacts in crisis. Right now, there is no plan to include the DHN in that list, but maybe someday...” (Y. Link, personal communication, 25 November 2015).

Additionally, the UNOCHA (and some of the other HROs) and DHN have adopted some GIS mapping tools and software and routinely partner with V&TCs such as the Humanitarian OpenStreetMap and MapAction. Such technology adoption improved collaboration between the information clusters and the digital volunteers in several humanitarian deployments.

“Humanitarian OpenStreetMap...produces map data and provides our technology platform like the Tasking Manager or the OpenStreetMap Export Tool....[HROs] often have to come to us for questions, for support, and it means that we are communicating more and we are talking more with those organizations” (K.Chapman, personal communication, 17 November 2015).

During the Nepal response, the HROs and V&TCs adopted the same information and communication technologies. For example, UNOCHA launched an open platform for sharing data called the *Humanitarian Data Exchange* (HDX) in July 2014 and requested HROs and V&TCs to upload disaster-related data to the platform to facilitate data sharing the immediate aftermath of the Nepal earthquake. After reviewing the HDX website content, the researcher found many V&TCs (SBTF, HOT, and Himalayan Disaster Relief Volunteer Group) and HROs (the UNOCHA, WFP, and the U.S. National Geospatial-Intelligence Agency) have adopted the HDX as a means of data sharing. It is the first attempt to promote collecting, storing, and sharing data among actors in the UN Cluster System. As Patrick Hernusi stated:

“We are leveraging technologies that we have available to us, and part of that is due to the DHN and Andrej.... The things we do here, like situational awareness, are some of the hardest jobs in the world. So, it’s nice to have partners who can move so fast in their ability to adapt and maneuver and try new things” (P. Hernusi, personal communication, 29 November 2015).

These tangible outcomes or ‘small wins’ show that incremental steps towards collaborative value can be made because they do not rock the boat, nor do they not stir up the great antagonisms and paralyzing schisms, as do proposals for more drastic change (Lindblom, 1979). Using Termeer and Dewulf’s (2019) characteristics and indicators of small wins, the Collaborative Process’ total outputs have been categorized below.

Table 9: Characteristics and indicators of small wins

Characteristic	Indicator	Contra-indicator
Concrete outcomes	Visible software and informational capacities.	Difficult to implement in the field.
In-depth changes	More frequent practices involving crowdsourcing and GIS mapping.	Too many contributions to keep track of and limited bandwidth to facilitate incorporation.
Moderate importance	Hybridization of UNOCHA and DHN coordination network. Emphasis on moving collaborations to training modules involving representatives from HROs and V&TCs.	Limited full-time coordination staff and few opportunities to articulate the added value of V&TC contributions, especially those that include digital volunteers and GIS mapping collaboration.
Judgement	Step forward for humanitarian innovation activism vis-à-vis technology adoption among HROs in the field.	Lack of ability to formalize HROs/ V&TCs collaborations. Incompatible organizational and management structures led to collaborative failures. Missed opportunity to derive a policy outcome that might strengthen humanitarian aid with V&TCs input.

Adapted from: Termeer and Dewulf, 2019

5

Although these have been most successful in driving activism for overhauling the HROs' information management processes and technical capacities, there have not been enough of them. For every successful collaboration and resulting innovation or report, more failures disincentivized information officers and other humanitarian professionals from requesting collaboration with the V&TCs. Many small wins may go unrecognized, may not be taken up, and may never become institutionalized (Goodman & Dean, 1982).

5.5.5.b. Strategic Plans: Scale Down and Refocus

As Ansell and Gash stated, "strategic planning occurs out of a continuum of collaboration encompassing either a structured or loose system of contacts, but with no specific expectations or commitments to jointly working together" (p.19). Up to 2015, the strategic plans for improving the collaborations did not change significantly from earlier calls for reform. There were no set plans regarding the collaborations nor how they might evolve. There were merely assumptions that the V&TCs would evolve into a legitimate force of stakeholders within the broader humanitarian aid sector. These assumptions came roughly out of the guidance materials for collaborating with V&TCs and HROs developed by the DHN with Andrej Verity's assistance and several DHN coordinators. However, in a follow-up

interview with Andrej Verity in 2016, new developments had arisen at UNOCHA regarding its relationship to DHN.

“UNOCHA is now in the process of a transition, developing new information management capacities. They are building these capacities by attempting to set up and cluster a large information management practice across the whole field” (A. Verity, personal communication, 9 December 2016).

He meant that UNOCHA was establishing a new office—the Center for Humanitarian Data⁸—researching the modernization of the UN Cluster System’s information systems and innovation streams. This was inspired partly due to the institutional coherence to standardize data collection, storage, and sharing between HROs, and a strategic shift in the attitudes towards crowdsourcing and digital volunteerism. Following the Nepal response’s drawdown, the researcher interpreted a mood shifted among veteran coordinators of UNOCHA. There were fewer meetings between them and the DHN coordinators and new reports regarding the V&TCs contributions. This had been somewhat peculiar, as the DHN typically archived all the reported materials. When the researcher asked about these developments, he received comments such as “we need it for reporting,” “its procedure,” “it has something to do with ‘the summit’ [World Humanitarian Summit].

During the waning days of the research collection period, the V&TCs called for a more substantial alignment of humanitarian mandates to their capacities, taking a stronger stand on modern humanitarian aid’s technological priorities versus the traditional logistical priorities. During the *Active Learning Network for Accountability and Performance’s* (ALNAP) Global Forum in June 2015, the HROs had called for reform to meet global demands for aid better. This change significantly implied a new direction in terms of attitude for the technical capacities of the V&TCs [and other contributors].

Precisely, new funding ought to have included a stronger emphasis on information management and technology adaptation. Towards this change, the UNOCHA helped organize the first World Humanitarian Summit in 2016, where innovation and technology were presented for the first time as high priorities. While only one summit on the matter was approved, the larger call for reform was rejected by UN Under-Secretary-General Stephen O’Brien, who in an interview (unrelated to the research) stated that “the UN doesn’t need to fundamentally change,” but to “build

8 See: “Centre for Humanitarian Data: Connecting People and Data to Improve Lives.” OCHA, 1 Mar. 2019, www.unocha.org/story/centre-humanitarian-data-connecting-people-and-data-improve-lives.

on the best” and “bring in additional innovation and skills” (S. O’Brien, op cit, “Q&A: ‘UN doesn’t have to change,’ says relief chief,” 16 October 2015).

Although his statements were not directed at the DHN specifically, they did imply a change in the HROs’ collective strategy for humanitarian aid going into the next decade⁹. It should be noted that the V&TCs did not field a presence at the World Humanitarian Summit, nor were they mentioned in any of the 100+ innovations¹⁰ being cited from years of experimentation with ICTs. A shift in attitude seemed to have occurred from the HROs side that cast doubt on the future of the collaborations with the V&TCs. However, there is insufficient evidence to suggest that the shift in strategy had been directed due to the failure to collaborate with the V&TCs specifically.

However, the shift in strategic mentality among the HROs can be deduced from the sudden and significant attention given to the notion of ‘innovation centers or hubs’ post-2015. For instance, the UNOCHA had accelerated talks of opening an innovation center in the Hague, Netherlands, and the IFRC and started work on their own ‘Volunteers for Data Literacy Program,’ which offered a new venue to explore innovation and training in the use of open-source ICTs. These spaces would serve as collaborative ventures where informational problems could be explored in a more inclusive manner outside of the disaster response timescale, where inclusion was an issue. Additionally, the HROs had begun accelerating attention in the IFRC’s focus on promoting the Humanitarian Exchange Language (HXL), aiming to standardize open-source data collection across the HROs¹¹.

“In 2016, the International Federation of the Red Cross and Red Crescent Societies (IFRC) embarked ... to improve its information management capabilities ranging from technical platforms to data literacy. A core element of that strategy is the Humanitarian Exchange Language (HXL), a standard that works by adding semantic hashtags to the top of columns in spreadsheets and systems to make it easier to process, combine and visualize data” (S. Johnson, op cit, “HXL is creating efficiency at the IFRC,” 2016).

-
- 9 See: Rowling, M., & Whiting, A. (2016, May 25). Aid experts give first World Humanitarian Summit mixed report card. Retrieved September 25, 2020, from <https://www.reuters.com/article/us-humanitarian-summit-aid-reaction-anal-idUSKCN0YG1XM>
- 10 See: “Agenda for Humanity: Innovations Showcase”. World Humanitarian Summit, 23 May 2016 <https://agendaforhumanity.org/sites/default/files/resources/2017/Jul/ExhibitionFair-Participants-InnovationMarketplace-Booths.pdf>
- 11 Johnson, Simon. “HXL Is Creating Efficiency at the IFRC.” *The Centre for Humanitarian Data*, International Federation of the Red Cross & Red Crescent Societies, 2016, centre.humdata.org/hxl-is-creating-efficiency-at-the-ifrc/.

Amid the developments with World Humanitarian Summit, the DHN had also begun their talks with the Federal Emergency Management Agency (FEMA), one of the agencies responsible for crisis management in the U.S. These talks had a forward-leaning approach to integrating social media technologies with the help of digital volunteers. Ryan Burns had predicted this partnership in 2013, and indeed by 2016, the DHN began courting FEMA more regularly.

FEMA is likely to use V&TCs in the future because of their success leveraging the public in large scale disasters.... FEMA is just getting their feet wet... The lasting collaborations haven't happened yet, but they will. (personal communication, 9 June 2013)

Vangen and Huxham (2003) stated that collaborative relationships at some point need to balance between the accountability of the partners to their respective parent organizations and to the collaborative forum itself. With this in mind, the case of HROs and V&TCs shows that accountability seemed to be an issue tied to the actors' weak commitments to collaborate. Their lack of commitment was influenced by their lack of trust in each other at the network level, which led to further cascades of failures in the Collaborative Process. Huxham and colleagues (2000) refer to this as 'collaborative inertia' to describe a situation in which the apparent rate of work output from a core group is much less than expected due to reduced accountability and autonomy from parent organizations.

They further argued that the 'collaborative inertia' will decline if fundamental issues of trust and commitment are not solved promptly and result in partnership fatigue or a state in which the collaborating actors will desire to scale down and give up the collaborations (p.247). Judging by the scale down of the HROs/V&TCs collaborations between 2016-2017, it is clear that the strategic plans for collaboration after the Nepal response had shifted in favor of a drawback.

The takeaway from these strategic developments suggested that both had started looking for alternative venues for achieving their goals, as Ansell and Gash (2008) had warned. However, that is not to say that the collaboratives were a total failure. In the latter years of the DHN, circa 2015-2017, there were plans to shift the collaborative timescale away from disaster response to disaster preparedness or 'before a disaster.' Meaning that the process of exploring how big data can be better integrated would be shifted to the innovation centers or 'hubs' rather than take place organically during the actual deployments. These hubs would have dedicated staff and resources for exploring better ways of integrating crowdsourcing and crisis mapping capacities to formal humanitarian aid.

Table 10: Innovation Centers Examples

Innovation Hub/Center	Type/ Partnerships	Purpose
Humanitarian Tech Hub	HROs/Business/ Academia/Public	The International Committee of the Red Cross (ICRC) launched the research and development program and the Swiss Federal Institute of Technology in Lausanne (EPFL) in 2017. It fosters collaboration between the humanitarian and scientific sectors.
Center for Humanitarian Data	UNOCHA/ HROs	It was established in 2017 to support the exploration of [big] 'data' and its usability in humanitarian aid.
Humanitarian Innovation Fund	NGOs	Supports NGOs through stages of innovation with their grant's facilities.
Stanford University Design School	Academia	A teaching and collaborative problem-solving center focused on ICT and world issues.
United States National Innovation Center	National government	Supports national innovation with ICT and hosts a space for public/private technology partnerships.
Innovation Design Engineering Organization	Business	A global design company that specializes in 'innovation' in for-profit sectors.
UNHCR Innovation Fund	UNHCR/ HROs	Provides teams with funding support for experimentation and mentorship in order to nurture innovation and adaptability within UNHCR.

Furthermore, shifting the *Collaborative Process* away from the organic, messy environment of the field to the innovation centers would give the notion of 'humanitarian innovation,' especially social media and crowdsourcing, more legitimacy and physicality that'd been missing in prior years. This strategy change also signifies a significant shift in the relationship, which signals a drawdown of their work together due to partnership fatigue. This is warned about by Ansell and Gash (2008) as they noted that actors in a complicated problem-solving situation might become disgruntled with the *Collaborative Process* in the absence of a clear plan for moving forward. Since the collaborations between HRO and V&TCs never made it past the experimental phase, it was inevitable that the failures would lead to their disengagement from each other.

5.5.5.c. Joint Fact-Finding: Feedback Loops

The final sub-variable in the *Intermediate Outcomes* was the ability of the HROs/V&TCs to achieve *joint-fact-finding* assignments about their successes and failures.

Essentially these became the lessons learned documents and after-action reports produced by UNOCHA and the DHN and archived on the latter's website¹². By late 2015, the DHN seemed to be experiencing an existential crisis, as the V&TCs' contributions were not matching the information needs HROs. According to Helen Campbell, there was a growing concern that distrust between HROs and V&TCs (excluding UNOCHA and DHN) was widening due to a tendency to 'reinvent the wheel' with each new crisis (H. Campbell, personal communication, 18 November 2015). By 2015, the HROs had recognized the persistence of big data and its potential to complement formal response to crises, even though they still struggled to address the necessities that involve packaging, formatting, and dispatching that data into usable information products. This is known as 'feedback looping'; however, doing this requires bridges often filled by many people in a merging network. Unfortunately, the period between 2013-2015 had not yielded such a result.

"A lot of the value comes in the long-term feedback. Unfortunately, it's hard to ask people to buy into long-term feedback for a lot of the humanitarian professionals it's like having to produce duplicates of reports they are already doing with other partners. There are problems of sustainability, feedback loops, and these are problems in the HROs and the V&TCs" (H. Leson, personal communication, 10 October 2015).

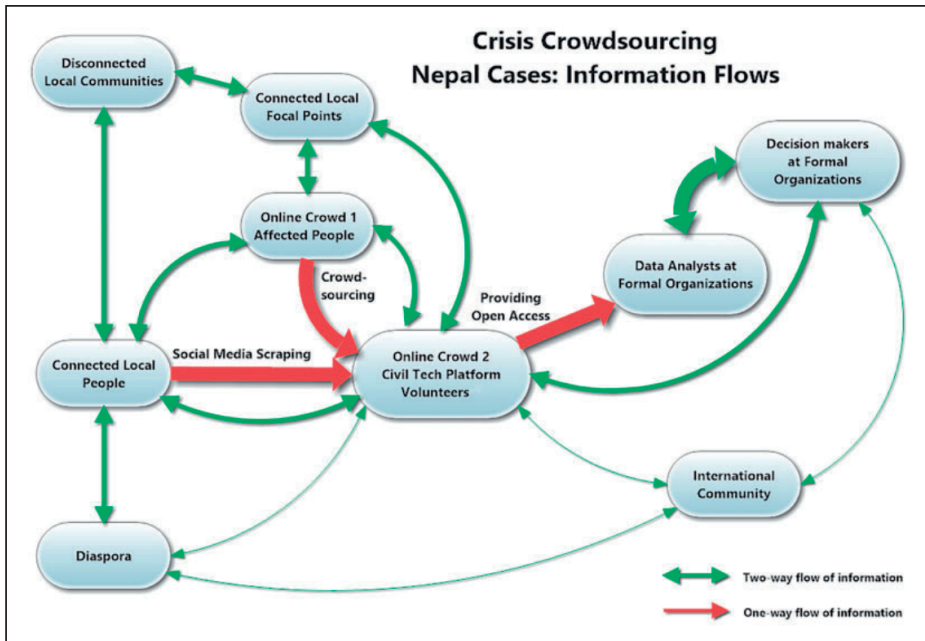
In Chapter Three, we gave an example of how the V&TCs integrated the big data into the information management flows of the HROs in the Haiti response noting the lack of feedback between the requesting HRO and the aid beneficiaries. Recall that the HROs did not have the means to make sense of the beneficiaries' needs as directly relayed via their social networks on Twitter, Facebook, or Instagram. The lack of feedback from the beneficiaries is an overlooked connection between the HROs and V&TCs. Both struggled to conceptualize these accurately according to their interpretations.

Five years after the Haiti response, Nepal was struck by two major earthquakes in quick succession, prompting a swift response from the HROs. Compared to the Haiti case, digital volunteers powering the online platforms in Nepal took on a far broader role: in addition to collecting and processing disaster data, they also sought to generate feedback loops to locally based people, communicating directly with them about their needs and broadcasting information to them about the response (Moore, personal communication, 9 December 2016). Moreover, they explicitly attempted to reach the affected communities that were not online by sending volunteers into the communities or using low-tech collection methods. As with Haiti, big crowdsourcing data in Nepal translated into English by digital humanitarians

12 See: Past News and Events - Digital Humanitarian Network (digitalhumanitarians.com)

or local Nepali volunteers. Figure 17 shows the information flow from the field through different 'online crowds,' which in our case were organized by V&TCs such as *Humanitarian OpenStreetMap*, *StandByTaskForce*, *Kathmandu Living Labs (KLL)*, and *QuakeMap*.

Figure 17: Information Management Flows in Nepal



Source: Mulder et al., 2016

In this image, the main flow of information concerns big data being collected and processed, similar to Haiti. e.g., from the affected online people, via the data processing done by digital volunteers, to the analysts and decision-makers at the HROs, as indicated by the large red arrows), but there were also smaller, two-way flows of information between the different groups of actors. The Nepal case was unique because it was the first time since Haiti that there was a local presence for the V&TCs that could effectively coordinate with virtually all of the Kathmandu Valley actors; the Kathmandu Living Labs or 'KLL.'

Haiti and Nepali information management flows' key difference is that Haiti's crowdsourcing process was mainly linear. In contrast, the Nepali crowdsourcing work was made to create information loops linked back to the aid beneficiaries. Furthermore, Haiti's efforts were primarily led by remotely based digital volunteers with no personal links to Haiti, whereas the Nepalis themselves led the Nepal case.

This situation showed that V&TCs could effectively coordinate crowdsourcing efforts when working directly with the aid beneficiaries and their local government. However, in most humanitarian deployments, the V&TCs did not have access to these people and instead had to rely on the HROs for representation.

In a collaborative environment, multi-party decision processes include feedback loops to assist in fact-finding, and these are a crucial component to finding out what works and what doesn't (Lindholm and Woolcock, 1993). The feedback loops between the HROs, the V&TCs, and the ostensibly the aid beneficiaries remained mostly unchanged between 2010-2015, once more emphasizing the enormous reliance on coordinators to translate those needs in all directions of communication. The consequence was inconsistent feedback after each collaboration and a lack of control over the *Collaborative Process*' evolution, creating repeated mistakes between 2012-2016. Additionally, the data storage and sharing requirements posed significant challenges to the timely and useful information collection and management, resulting in fragmented workflows. As one humanitarian professional noted, the lack of feedback and a general lack of understanding on how to collaborate often led to independent operations becoming siloed in isolated workflows.

"There have certainly been lessons learned, and we continue to generate guidance documents that help people understand how they can work with us. Getting those out there, in the beginning, is very important for people. During the [Pakistan] floods, we saw many groups working independently... and many resources ended up clustered in some areas" (T. Doyle, personal communication, 18, October 2015).

What Mr. Doyle is saying is that independent workflows are common in humanitarian deployments. This creates a competitive culture where some people may not have the time or inclination to engage in feedback that could resolve collaborative issues. *Joint Fact-Finding* is typically conducted by experts and can provide value by revealing the practical applicability of collaboration outcomes, e.g., the inherently contingent nature of addressing a complex problem and question of representation from actors involved in its resolution (Schenk et al., 2016).

Although information-sourcing between the HROs and V&TCs was relatively efficient, there were very few feedback loops and poor information sharing. As a result, platforms such as the *Humanitarian OpenStreetMap* tended to flow information in one direction only: from V&TC to HRO. This was a problem because although the V&TCs were mostly successful in collecting data and turning it over to the Kathmandu Living Labs, the overall *Collaborative Process* suffered from a lack of feedback from the HROs. Again, this can be attributed in part to the HROs'

misunderstanding of who the V&TCs were and the extent of their involvement in the humanitarian 'space.'

"It is the responsibility of the activating humanitarian entity to provide a solid and compelling case for activation, detailing the realistic and expected impact ... Ensure that the organization in question is serious about allocating points of contacts who can provide regular feedback" (P. Meier, personal communication, 21 January 2016).

Essentially, the feedback process lacked an efficient loop that would ensure consistent improvement to the *Intermediate Outcomes*. Of course, the HROs and V&TCs did have the Digital Activation Protocol. However, this method was generally incomplete as it did not include a mechanism for feedback, and neither was it used effectively. As a result, the *Shared Outcomes* of the total *Collaborative Process* were inconsistent.

5.6. COLLABORATIVE OUTCOME: MIXED RESULTS

According to Ansell and Gash (2008), the *Collaborative Outcome* is traditionally related to policy or organizational change that stabilizes the *Collaborative Process* into a legitimate venue for complex problem-solving. Such policy outcomes usually regard broad-based inclusion of the actors into permanent arrangements that legitimize the *Collaborative Process* based on (1) the opportunity for actors to deliberate with others and (2) the representation of a broad-based consensus (Beierle and Konisky 2001; Geoghegan and Renard, 2002). Overall, the *Collaboration Outcomes* can generally be considered a failure considering the lack of interdependence between the HROs and V&TCs mentioned earlier. Although some interviewees expressed that the term 'failure' was subjective, it is clear that in five years, the *Collaborative Process* never achieved the policy result of an enduring partnership as envisioned in at founding of the DHN.

Bryson, Crosby, and Stone (2004) noted, "the point of creating . . . cross-sector collaboratives ought to be the production of 'public value' that cannot be created by single sectors alone" (p. 46). On the one hand, the V&TCs failed to achieve the policy outcome that would yield a sustainable partnership with the HROs, and possibly recognize them as a formal part of humanitarian aid. On the other hand, the HROs did become more attuned to the technical gaps regarding incorporating big data methods into their information management flows.

Although not every HRO has yet adapted to the use of ICTs in their work, they had begun establishing new laboratories, forums, and summits dedicated to addressing the question of new information management flows. So in this view,

the *Collaborative Process* may have been a failure. However, the goal of bringing awareness and technical adaption of the V&TCs' capacities to the HROs was partly achieved according to the DHN's founders (Patrick Meier personal communication, 21 January 2016; Andrej Verity, 6 personal communication, 6 November 2016).

This is evidence that change is ongoing in the humanitarian aid sector, though it will take more years to prioritize information management and big data more seriously eventually. At the same time, the V&TCs will have to acknowledge that 'humanitarian innovation' alone will not revolutionize humanitarian aid in the way they first imagined. Humanitarian aid is a massive responsibility that cannot be met solely through new technologies and good-will. The HROs will remain the eminent providers of aid despite all their complexities, while most V&TCs would either have to formalize or dissolve.

Regarding the ongoing challenges to information management in humanitarian aid, we see that the mixed *Collaborative Outcome* was due to significant divisions in how both sides viewed achieving successful humanitarian aid. Indeed, broad-based inclusion in the *Collaborative Process* is not merely a reflection of the open and cooperative spirit of achieving good governance; it is at the heart of a legitimization process. The weak or non-inclusive representation can undermine *Collaborative Outcome's* legitimacy (Beierle and Konisky 2001; Geoghegan & Renard, 2002; Ozawa, 2019). In this way, the *Collaborative Outcome* of the HROs and V&TCs resulted in two steps forward and one step back between 2012-2018.

That said, there were some follow-up interviews with the facilitators such as Andrej Verity, Heather Leson, Roxanne Moore, Helen Campbell, and Cat Graham in 2016 and 2017. In these follow-up sessions, the interviewees expressed worries about information management fragmentation following the collaborations' decline. Interestingly, this decline coincided with Andrej's departure from the FIS in Geneva to another posting within UNOCHA. Similarly, all of the DHN coordinators also transitioned to permanent employment elsewhere; e.g., Roxanne Moore and Heather Leson went to work for the UNOCHA and IFRC, respectively a significant role in establishing new training hubs for digital volunteers.

As was the case in Nepal, many information products developed by the V&TCs, whether they were maps, dashboards, or smart-device apps for various assessment purposes, remained unused. Simultaneously, it is true that different contexts in collaborations always yielded different outcomes at different stages of the *Collaborative Process*. The potential of any policy outcomes regarding the future of collaboration was not representative of a broad-based consensus, precisely because the value of the V&TCs contributions was either misrepresented or ignored. However, the fault for the collaborative breakdown, as evident in the few

Collaborative Outcome represented in the information products themselves, cannot fall just on the HROs; the V&TCs were at fault.

On the other hand, the V&TCs' had been fueled by a belief that each well-crafted answer's validity is a composite understanding of a larger problem. Meaning that all data collected by them could be potentially valuable, but what was needed was to ask the right question, which the HROs were not necessarily doing. On the other hand, the HROs were locked into their formal information management routines, which required probing into specific areas of concern. Thus the HROs and V&TCs' opposite approaches to the common problem were never overcome, save for the IASC's coordination guidelines for collating all the different information products (e.g., HXL Relief-Web. Information is shared according to convenience or need, not consolidated, and the UN Cluster System's decentralized nature ensures that those sectors of activity led by the HROs remain largely isolated.

The work of the V&TCs is fundamentally opposed to this design since 'big data,' mostly derived from social media sources, can cross-cut organizational boundaries and activities. Thus, fragmentation of the information management flows became a significant design challenge of deep importance. Indeed, by the period between 2017 to 2018, there were hardly any new requests for collaboration from the HROs. Similarly, with the V&TCs, their work also turned to new venues focused at disasters' local levels.

Although most of the interviewees favored continued cooperation, they generally agreed that a directive approach to their problems was unrealistic. However, a minority of the interviewees did break from this line of thinking, with statements such as: *'you should have a central; 'we'd be more efficient if we were sharing one strategy rather than having different approaches. 'It would be great to agree on one strategy'; and 'you need command and control' (....).*

Such viewpoints were more commonly held by people who had full-time coordination jobs rather than line information officers working either at headquarters or field levels and in temporary arrangements pertinent to a specific deployment. These indicated a disconnect between the recipients of the V&TCs' efforts, e.g., humanitarian professionals on the ground, and those tasked with bringing those capacities to the field, e.g. the facilitators or UNOCHA/DHN coordinators. Kettl (2002) argued that developing the systems and personnel able to integrate collaboratives or horizontal systems with the traditional vertical, specialized, and functional systems would be a significant challenge for any collaborating actors. It was primarily considering the existing bureaucracies on the side of the HROs, which tended to contradict the Collaborative Outcome's efficacy.

In the final interview with Andrej in 2017, he stated that integrating big data and crowdsourcing to humanitarian information management was still a challenge despite the slow adoption of platforms such as *Humanitarian ID*, *Elva Community Engagement*, *Humanitarian OpenStreetMap*, *MasterCard Aid Network*, et cetera. It also remained difficult to synthesize data from diverse workflows for each HRO and their activity sector per the UN Cluster System and inhibited a disaster's composite picture. In conjunction with such fragmented efforts, Gray (2000) identified in his work that changes in network structure and shifts in power distribution affect systemic, collaborative capacity.

The types of outcomes produced by the HROs and V&TCs over several years can still be summarized as they were described at their founding: 'Ad-hoc.' Meaning that little had changed between 2012-2017, and the collaborations disintegrated altogether. However, it should be noted that at least the HROs are aware of their technical issues and the need to improve their information management capabilities seriously. On the other hand, the V&TCs may have learned that technology and activism will not move bureaucracy mountains. Unfortunately, both missed a tremendous opportunity to improve sensemaking with crisis mapping.

5.7. SUMMARY OF THE FINDINGS

This section will summarize the chapter's main findings according to the variables that make up the Collaborative Governance Model. Using this theoretical approach, we arrived at several key elements that contributed to the research findings.

Institutional Design

The HROs/V&TCs collaborative relationship is characterized by the incompatibility of their existing information management flows, work practices, and identities. The HROs are hierarchical, bureaucratic, and conservative structures, focused on paper documents, while the V&TCs stand out as flexible, flat, fast, and innovative. These differences often clashed during collaborations when not managed by a UNOCHA or DHN coordinator. The institutional characteristics between the HROs and V&TCs are very different from each other, and at times these differences created problems in the *Institutional Design* of the *Collaborative Process*. In particular, the inclusiveness in negotiating the terms of collaborations depended on the appropriateness of the V&TCs' [remote] presence in humanitarian deployments. Since V&TCs were not considered stakeholders of humanitarian aid, their participation in setting the conditions for collaboration was limited to the HROs' availability and mentorship in UN bureaucracy.

Chrislip and Larson (1994, cited in Ansell & Gash) wrote, "the first condition of successful collaboration is that it must be broadly inclusive of all stakeholders

who are affected by or care about the issue” (p.14). In the case of the HROs and V&TCs, the notion of a ‘stakeholder’ is diluted to the term actor since V&TCs cannot be stakeholders of humanitarian aid (even if some may include people from the disaster-affected location), only contributors pending their formalization. In that understanding, the HROs were the primary stakeholders in the relationship between the two networks. They, therefore, had a more significant advantage in setting the rules of engagement for collaborations.

The *Institutional Design* of collaboration between the HROs and the V&TCs followed the UN Cluster System’s generalized example, which stipulated that HROs lead and the V&TCs follow by being sensitive to their information needs in the field. In this context, the *Institutional Design* of the *Collaborative Process* is best summarized by Ansell and Gash (2008) as ‘the only game in town,’ meaning that the collaborative forum depended on the HROs’ signal to collaborate and the limited capacity for V&TCs to alter the terms. Several of the interviews spoke that the V&TCs did have some input into the *Collaborative Process* via the technical aspects of responding to requests via the DHN ‘digital activation protocol’. In this way, the V&TCs held a more consultative role in determining the ground rules for collaboration than as equal partners. Thus, *Collaborative Outcome* could not be expected to hold a long-term policy solution for addressing the V&TCs presence in humanitarian aid.

Starting Conditions

The *Starting Conditions* can be simplified down to four broad variables: (1) imbalances between the resources or power of different actors, (2) the incentives that actors have to collaborate and (3) the actors’ institutional and internal pressures, and (4) their history of conflict or cooperation (Ansell and Gash, 2008).

Power and knowledge asymmetries

The *power and knowledge asymmetries* refer to the problematic imbalances between HROs and V&TCs in their collaborative *Starting Conditions*. For instance, the HROs faced significant pressure from donors to produce high-profile results with particular NGOs or governments, e.g., the highly publicized response to the Nepal earthquake in 2015 or the ongoing Syrian conflict. On the one hand, the V&TCs entered humanitarian aid in 2013, lacking the organizational infrastructure and accountability to make them more attractive to the HROs. On the other hand, the HROs relied on the V&TCs to articulate the applicability of their capacities. These also implied the potential value of big data and its connection to the HROs’ aid beneficiaries. In this way, the V&TCs could negotiate with the HROs on their collaborations and commit to acting in good faith.

Incentives/Deterrents to Collaborate

In the case of the HROs and V&TCs, their incentives to participate in collaboration are tied to how many successful information products or 'humanitarian innovations' could be produced in line with the field's needs. As Ansell and Gash (2008) stated, the incentives/deterrents to collaborate depended in part upon the actors' expectations about whether the Collaborative Process can yield meaningful results. Between 2013-2015 there was significant hype around the notion of humanitarian innovation and revolutionizing humanitarian aid through 'big data.' That hype was the motivation or 'incentive' which initially carried the attention of the HROs. However, this eventually turned to collaborative fatigue as several years of ad-hoc collaborations failed to produce a formalized partnership.

Pressures and Influences

Although the HROs and V&TCs had an initial incentive to collaborate, both were influenced by the pressures for sustaining donor support and being competitive among many other NGOs, non-profits, and other actors in the humanitarian aid milieu. This meant that the Collaborative Process was not devised in a deliberative way. For instance, several interviewees cited organizational culture towards humanitarian aid as risk-averse to innovation partly because capacity-building had to be tailored to individual and national circumstances. Thus, the development of ICTs by the V&TCs, most notably crowdsourcing capacities for big data, remained limited because there was no holistic approach to existing information management flows in regional and subregional bodies and other relevant organizations.

One theme pertinent to the utilization of crowdsourced mapping methods was the political environment of a humanitarian deployment. While it's not fair to suggest that HROs feared collaboration, many were undoubtedly wary of it against their mandates' backdrop, lack of technical knowledge, and pressures attributed to donor attraction and competition. The V&TCs also had their pressures that shaped their preconditions before a collaboration. However, these concerned the extent that their formalization would take shape and whether they should seek alternative venues to gain access to the field of humanitarian deployments.

Prehistory of Cooperation or Conflict

All the collaborations involving the V&TCs preceding the formation of the DHN were almost exclusively with the UNOCHA, and their experiences began in a positive light. Between 2013-2015, there was a significant uptick in relations due mainly to the UNOCHA's/DHN's leadership. Nevertheless, in several 'activations' reported by the interviewees, it became clear that significant issues were existing in the UN information management flows and processes being incompatible with the notion of collaboration with the V&TCs. These, along with the lack of available coordinators, contributed to a growing ratio of failures. The timeline provided in the

analysis illustrates the events that follow the period between 2015-2018 showed a significant decline in activations and indicated a significant shift in the relations between the HROs and V&TCs.

Ultimately, new collaborations require a third party willing to manage the *Collaborative Process* toward a productive result. Again, it must be reiterated that the HROs and V&TCs had no reason to be antagonistic. However, they did rely on individual coordinators to act as both leaders of the *Collaborative Process* and activists for 'humanitarian innovation.' Therefore, transparency of the *Collaborative Process* has embodied in their management rather than the collaborating parties themselves. Since the coordinators could only manage a small number of collaborations, the *Collaborative Process*' management suffered recurring issues stemming from general unpreparedness and a lack of commitment to improve said management. We attribute this to three issues: the modeling of all collaborations on the UN Cluster System framework, the lack of initial incentives to collaborate, bureaucratic influences and pressures, and insufficient familiarity with the technical knowledge needed to make use of the V&TCs capacities in existing workflows. All these issues together would require the permanent presence of facilitative leaders.

These findings show that the *Starting Conditions* were fraught with institutional pressures and influences from both sides and contributed to several of the *Collaborative Process* failures, especially the actors' *Commitment to the Process* and *Shared Ownership for the Process*. For instance, collaborations took on the UN Cluster System's general ad-hoc nature in which the HROs enjoyed primacy. Nevertheless, the widening technical gap, as evidenced by the increasing utilization of social media and GIS systems, made the V&TCs impossible to ignore. So, there were significant organizational deterrents but practical incentives to collaborate.

Facilitative Leadership

The coordinators from UNOCHA and DHN were an integral part of managing the *Collaborative Process*. Nevertheless, the HROs' over-reliance on them indicated a broader integration of services was bottlenecked within the coordinators' networks. At the time of the researcher's secondment, only a handful of collaborations could be managed at any given time, thus contributing to the collaborative fatigue experienced between 2015-2018. The facilitators made up a small core of coordinators who were the lynchpins of the collaborations and the leaders and advocates of the V&TCs. The coordinators acted as facilitators of collaboration, and they were necessary for articulating positions and needs and mitigating the risks of actors. The most successful collaborations were those managed from start to finish by a coordinator either from UNOCHA or DHN.

Unfortunately, the number of requests far exceeded the bandwidth available to do this effectively. The merging of the two networks did not occur as anticipated at the DHN's founding in 2012. The facilitators worked much like a sparkplug in a motorized engine. Without them, the entire *Collaborative Process* would not initialize. So, at a smaller scale, the collaborations could be more effectively manage the articulation of needs of HROs and added value of the V&TCs. However, on a larger scale, the DHN coordinators did not have enough full-time staff to cover the volume of possible collaborations, contributing to the lack of inclusivity in the *Collaborative Process*. This resulted in the UNOCHA, or more specifically the FIS branch to help raise awareness of the V&TCs' existence through guidance documents and other publications and the collaborations' management at their peak in 2015.

Collaborative Process

The *Collaborative Process* itself consisted of five sub-variables that determine whether the V&TCs integration with the HROs was feasible. These variables were *Trust Building*, *Commitment to the Process*, *Shared Ownership of the Process*, and *Intermediate Outcomes*. As stated earlier, the *Face-to-Face Dialogue* was almost non-existent, requiring the facilitators to act as brokers to jump-start the *Collaborative Process*. If we view the *Collaborative Process* as an engine, then there were significant flaws in its components. Specifically, a lack of commitment by the HROs, a lack of articulation work by the V&TCs, and a lack of shared understanding was sure to determine failure most of the time. Although some of the failures were mitigated with the support of the UNOCHA and DHN, these too were only stop-gaps to a larger problem—the collaborations were either too unprepared or unstructured to succeed or designed to fail altogether.

In general, the *Collaborative Process* was a mix of success and failure due to trust and commitment issues. Also, there were persistent, missed opportunities to articulate the added value of the V&TCs and the applicability of ICTs in the humanitarian aid sector, especially concerning the crowdsourcing of big data into crisis maps and population tracking applications. For instance, the V&TCs could not address significant concerns in their accountability and availability for long term collaborations. These, in turn, influenced variables such as the *Shared Ownership* and *Openness to Exploring Mutual Gains*. Consequently, the incentive to remain engaged in a long-term partnership declined over the years as failures outweighed successes.

Face-to-Face Dialogue

Since the collaborations between the HROs and V&TCs were virtual, the UNOCHA had to bring the DHN coordinators into the formal communication channels of the HROs and manage those interactions directly. Only some V&TCs like

StandbyTaskForce, MapAction, and GitHub gained enough credibility between 2012-2015 to be generally accepted by the HROs without a coordinator's need. In most cases, though, the coordinator's support was crucial. Therefore, coordinators such as Andrej Verity, Craig Williams, Helen Campbell, Roxanne Moore, or Heather Leson, had to leverage their professional networks to encourage introductions and push the *Collaborative Process* forward. As mentioned in section 5.2., the V&TCs had few, if any, representatives in the field to negotiate their presence in humanitarian deployments.

Much of the activities in humanitarian deployments depended on personal relationships. Due to a lack of such connections, the V&TCs were hard-pressed to compete for the attention of the HROs. Therefore, not having that representation in the field was indeed an issue for the V&TCs, which complicated their attempts at establishing trust, commitments, shared understanding, and a limited number of successful outcomes with the HROs. A permanent solution to this problem never materialized before the eventual collaborative fatigue set in. However, at the peak of their relationship, the coordinators increasingly became active as social brokers, engaging in the activity of 'social brokerage' and 'boundary spanning' to catalyze the actors into motion towards each other.

Trust Building

As Ansell and Gash (2008) stated, collaboration is not merely about negotiation but also about securing its sustainability through *Trust Building* practices. Unfortunately, the absence of *Face-to-Face Dialogue* made it difficult for the V&TCs to engage with the HROs indirect practices that demystify each other's stereotypes and reduce risks. In this case, the absence of *Face-to-Face Dialogue* in short-term instances of intense collaborations did not present specific examples of *Trust Building* because the V&TCs, via the DHN, was still attempting to grow their presence in the organizational landscape of humanitarian aid circa 2015.

Through the UNOCHA/DHN coordinators' efforts, swift trust was used to incentivize the HROs into forums with the V&TCs. Swift trust also stabilized the interactions over time, and as relations improved, the two networks began to reorder themselves based on the shared willingness to have better connections. This involved the often-intensive activity of articulating and managing both networks' needs and positions and eventually led to creating a third network made up of individuals from both the HROs and V&TCs, respectively. Unfortunately, this network did not expand enough by 2017 to warrant the continuation of the collaborations.

Commitment to the Collaborative Process

Commitments to the Collaborative Process were challenging to obtain because the nature of the collaboration was ad-hoc. At the organizational scale, the HROs

[except UNOCHA] were not significantly invested in collaborative efforts with the V&TCs to sufficiently commit themselves to a deliberate partnership. On the one hand, getting the HROs to commit to the collaborations required considerable individual efforts by the UNOCHA and DHN. On the other hand, the V&TCs also struggled with commitments. They struggled to articulate their added-value because they approached the problem of disaster sensemaking with a technological outlook for empowering disaster-affected people, and not the HROs necessarily. They also were unable to remain engaged in prolonged humanitarian deployments; their accountability to both the HROs and the aid beneficiaries often came into question.

Due to significant time constraints, most HROs had their collaborative networks preestablished with other NGOs leaving fewer opportunities to explore the possibilities with the V&TCs. Because of this, the commitment to collaborate, or lack thereof, from both sides were motivated by different factors. On the one hand, the HROs seemed to be economically oriented rather than logistically, resulting in significant technical issues that remained neglected until the UNOCHA outlined the urgency of updating the HROs' information management capabilities. Even then, humanitarian professionals' low bandwidth and lack of preparedness to collaborate made it much harder to retain a sustainable relationship between the two networks.

Although this problem was compensated with establishing a third coordination network made up of representatives from both HROs and V&TCs, it came too late to stave off collaborative fatigue. On the other hand, the V&TCs were motivated by their desire to revolutionize how humanitarian aid was organized and possibly shift it to a more horizontal distribution of actors with lower accountability qualifications. From these two perspectives, it is clear that the HROs and V&TCs were unlikely to overcome these motivations without the help of the DHN, which in turn could not instantiate the HROs to commit to collaborate without the help of the UNOCHA. Thus, both could not possibly engage each other effectively until the tech and management gaps were addressed in unison.

Mutual recognition of interdependence

Interdependence typically occurs when two or more actors share in the opportunities and constraints that shape the prevailing environmental factors for collaboration (Emerson and Nabatchi, 2015). This was not the case with the HROs and V&TCs and was the most visible sign of failure in the *Collaborative Process*. The work of Van Gorp (2014) was the first identification of challenges dealing with several systemic issues, e.g., the limited availability of resources and staff of the HROs, the challenge of managing volunteer commitments by the V&TCs, different levels of engagement among members of both networks and the insistence of risk-free collaborations. By 2016 these challenges had persisted. On the one hand, the HROs needed to

know how the V&TCs could improve their disaster sensemaking and, according to the HROs individual agendas. Simultaneously, there were few metrics to value the successes of the collaborations due to low feedback. For these reasons, the efforts of the V&TCs have remained on the periphery of the humanitarian aid sector. The V&TCs, on the other hand, needed better guidance and representation in the UN Cluster System, which the HROs were too preoccupied or reluctant to facilitate.

Shared Ownership of the Process

Shared ownership implies the shared responsibility for the *Collaborative Process*' management (Emerson, Nabatchi, and Balogh, 2012). This meant that actors fully accept each other's roles and share the burden of management and its risks. Interestingly, the persistent confusion or inability to resolve the accountability over who would lead the *Collaborative Process* was generally the cause of a lack of ownership over the collaborations' success. Technically, the process should have been led by the HROs, as they were responsible for instantiating it in the first place. However, after instantiation, they expected the V&TCs to take over the *Collaborative Process*' management given their technical knowledge of the issues at hand. This failing is attributed to neither side being prepared to collaborate and not having progressed their ability to manage their collaborations over several years. This was a significant missed opportunity and inevitably contributed to the lack of interdependence and low commitment to move their work from the ad-hoc nature to an ongoing partnership.

Openness to Exploring Mutual Gains

Although the UNOCHA and DHN did strive to explore mutual gains, the HROs never fully embraced the relationship to the V&TCs. Instead, they reinforced the ambiguity revolving around the V&TCs' sense of belonging or having a stake in humanitarian aid. It was expected at the DHN's founding that HROs and V&TCs would naturally come together and come into new working arrangements. Unfortunately, this was not the case, as the HROs lack of bandwidth often led to more collaborative failures than successful ones. As such, the responsibility to explore the mutual gains to be shared lay with the DHN, which in turn relied on UNOCHA to broker arrangements with the HROs. Thus, UNOCHA and DHN did strive to explore their mutual gains for collaborating, albeit to form an 'informal' humanitarian space where HROs could outsource their information needs—a bazaar of technology and talent. By 2015, it was clear that there was an incentive among several HROs: the UNOCHA, IFRC, WHO, and WFP to explore the mutual benefit of collaborating with V&TCs from a bottom-up approach not require regulation.

Shared Understanding

The development of *Shared Understanding* is part of a more extensive collaborative learning process to assess the extent of the actor's participation inadequately

managing the *Collaborative Process*. Therefore, *Shared Understanding* is composed of defining a clear mission, defining a clear problem (that they face together), and identifying common values. The UNOCHA and the DHN had been collaborating for several years before the researcher's secondment. In that time, they learned much from each other, and they generally cooperated. However, this never extended beyond their different understanding of the technical challenges of incorporating big data into information management flows. On the one hand, most HROs never fully appreciated the potential of the V&TCs and saw them as an experimental resource rather than a partner. On the other hand, the V&TCs never developed the reputation and structure needed to become equal actors fully.

Defining a Clear Mission

The characteristics of each collaboration varied based on the requesting organization's needs and the capacities required. Therefore, defining a clear mission was different for every new collaboration and vaguely determined. In developing collaborations with V&TCs, reliability and predictability became recurring issues for the HROs. Before a deployment, HROs desired a clear understanding of the services and products that the V&TCs had to offer. Some V&TCs had direct contributions, while others were less explicit of their services. Notably, the lack of the V&TCs' articulation of their added-value or how they could benefit information management as permanent partners were compounded by a "Lack of bandwidth" (A. Verity, United Nations Office for the Coordination of Humanitarian Affairs, 23 November 2015), "lack of knowledge about the V&TCs" (Y. Link, United Nations Office for the Coordination of Humanitarian Affairs, 4 November 2016), and "poor understanding on how best to connect the work that the V&TCs do [into formal information process]" (C. Hendricks, United Nations Office for the Coordination of Humanitarian Affairs, 26 November 2015).

The lack of articulation was often explained as 'flexibility' among the V&TCs, in line with humanitarian deployment's fluid nature. Meaning that the V&TCs saw their mission as better served by first waiting to see what problems the HROs were dealing with and then develop solutions to those problems rather than have preset services/products ready for use. On the other hand, the HROs interpreted that flexibility as a lack of reliability. Several interviewees expressed dissatisfaction regarding the inability of both HROs and V&TCs to resolve a shared vision for what they could both accomplish together despite several years of experience with one another. As a result, there were fewer requests for collaboration than was expected at the founding of the DHN in 2012, and this trend increased slowly into 2015 but dropped sharply in 2016.

Common Problem Definition

The problematization of the HROs and V&TCs common problem depended on a consensus regarding the reasons for their previous failures. Such consensus was crucial and consisted of framing a *common problem* that can align the HROs and V&TCs together as a springboard to action. In 2015, there still was a lingering lack of contextual understanding about crowdsourcing and social media in disasters by the HROs. Similarly, misunderstandings by the V&TCs persisted regarding the socio-cultural and geographic context of humanitarian deployments and the types and scales of processes for addressing them. For example, the 2016 Ecuador earthquake and the 2015 Nepal earthquake both attracted many V&TCs. However, despite some similarities in the crisis type, integrating crowdsourced data in the response varied relief chain. The interviewees generally agreed that feedback loops between the HROs and V&TCs were necessary to solve the technical gaps and generate better management of the *Collaborative Process*. However, up to the point of the research (circa 2015), a fixed process for achieving that problematization had not materialized. The humanitarian field had been flooded with technologists and what one interviewee called 'part-time humanitarians' seeking to test-bed their ideas rather than assist the HROs or disaster-affected communities. The overabundance of new software, new apps, and new maps had become so persistent that towards the end of 2015, it became common to disregard the contributions of the V&TCs in impact reporting.

Identification of Common Values

The HROs and V&TC generally had shared common values, as evidenced by their history of cooperation and the hybridization of the coordination networks between the UNOCHA and DHN. However, they struggled to develop a common understanding of their joint problems contingent upon both sides' recognition of collaborative compatibility. Unfortunately, in the case with the HROs and V&TCs, this had been mostly unsuccessful due to two institutional challenges: (1) The lack of standardization among the HROs concerning the use of open-source data (social media sources, SMS, et cetera) into formal IM reporting procedures, and (2) the inability of the DHN to expand its pool of coordinators, especially those that could have access to the field. Without either of these, the *Collaborative Process*' outputs continued to be inconsistent well into 2016, with the steady reduction of willingness to collaborate from both sides. Andrej Verity and Helen Campbell referred to this as the 'half-in/half-out' mentality, which persisted throughout the entire length of the HROs and V&TCs years of collaborative experimentation.

Intermediate Outcomes

The *Collaborative Process* yielded the informal adoption of various open collaboration tools first introduced by the V&TCs. These were represented as tools, platforms, or other innovations, e.g., HOT, AISDR, Relief-Web, QuakeMap,

among many others, that remained in use beyond the collaborations that produced them otherwise inspired a technical improvement among the HROs. Interestingly, despite the general management failure of collaborations, the V&TCs' successful contributions did remain in use beyond their inception.

On the one hand, there was general awareness and desire among the HROs to generate the kinds of capacities that V&TCs had been fielding, albeit without integrating the V&TCs themselves. Conversely, the V&TCs seemed to have been more focused on the humanitarian aid landscape as an ideal testing space to field their innovations rather than apply their solutions to a generalizable format across the UN Cluster System. In this way, one could view the overall *Collaborative Process* as a failure, albeit with some progress made in the awareness of technical services or products needed to modernize the HROs for sensemaking with big data.

Small Wins

In the case of the HROs and V&TCs, these were represented in the *Collaborative Process*' tangible outputs that justify continued collaboration. As Ansell and Gash (2008) called them, these 'small wins' yielded the informal adoption of various open collaboration tools that'd been introduced by the V&TCs. Over time, these tools' common usage could hypothetically change humanitarian affairs' culture to prioritize collective action over political ones. Although there isn't an official mandate to modernize the HROs with newer ICTs and management methods, there has been a slow and silent shift for more technical services, especially if they leverage big data through machine learning.

Strategic Plans

Up to 2015, the strategic plans for improving the collaborations did not change significantly from earlier calls for reform. There were no set plans regarding the collaborations nor how they might evolve. There were merely assumptions that the V&TCs would evolve into a legitimate force of stakeholders within the broader sector of humanitarian aid. These assumptions came roughly out of the guidance materials for collaborating with V&TCs and HROs developed by the DHN with Andrej Verity's assistance and several DHN coordinators.

By the beginning of 2016, the V&TCs had been calling for a more substantial alignment of humanitarian mandates to their capacities, taking a stronger stand on modern humanitarian aid's technological priorities versus the traditional logistical priorities. In response, it seemed that the IASC (HROs collectively) had decided that their strategic interests would be better served by focusing their technical adaption through other venues. Similarly, the DHN had also begun courting the Federal Emergency Management Agency (FEMA) in the U.S. These talks had a forward-leaning approach to integrating ICTs with the help of the V&TCs, especially

those that fielded digital humanitarians. Ryan Burns had predicted this in 2013, and indeed this seemed to be the case in 2016.

The shift in strategic mentality among the HROs can be deduced from the sudden and significant attention given to the notion of ‘innovation centers or hubs’ post-2015. For instance, the UNOCHA had accelerated talks of opening an innovation center in the Hague, Netherlands, and the IFRC and started work on their own ‘Volunteers for Data Literacy Program.’ In the latter years of the DHN, circa 2015-2017, there were plans to shift the collaborative timescale away from disaster response to disaster preparedness or ‘before a disaster’ as it was evident that the chaotic nature of that phase and the lack of bandwidth among humanitarian professionals was incompatible with the technical aspects of the V&TCs. Meaning that the process of exploring how big data can be better integrated into the formal information management flows of the HROs would be shifted to innovation centers or ‘hubs’ rather than take place organically during deployments. By 2017, the HROs and V&TCs had significantly scaled down their collaborations, owing to collaborative fatigue and the desire to meet their visions through separate venues.

Collaborative Outcome

As researched over several years, the outcome of the entire Collaborative Process can be summarized as they were described at their founding: ‘Ad-hoc.’ The HROs and V&TCs never developed a sustainable partnership, and their years of experience together was a mixed bag of success and failures. On the one hand, integration of the V&TCs as stakeholders of the humanitarian aid sector was not successful. On the other hand, the HROs did become more attuned to the technical gaps facing their field. These findings show that change is ongoing in the humanitarian aid sector, though it will take more years to prioritize information management in a deliberative manner. At the same time, the V&TCs will have to acknowledge that ‘humanitarian innovation’ alone will not revolutionize humanitarian aid in the way they first imagined. Their collaborations’ result was the de-escalation of their activities together, as both sides eventually fell into collaborative fatigue and decided to seek alternative venues to achieve their goals.

6

DISCUSSION

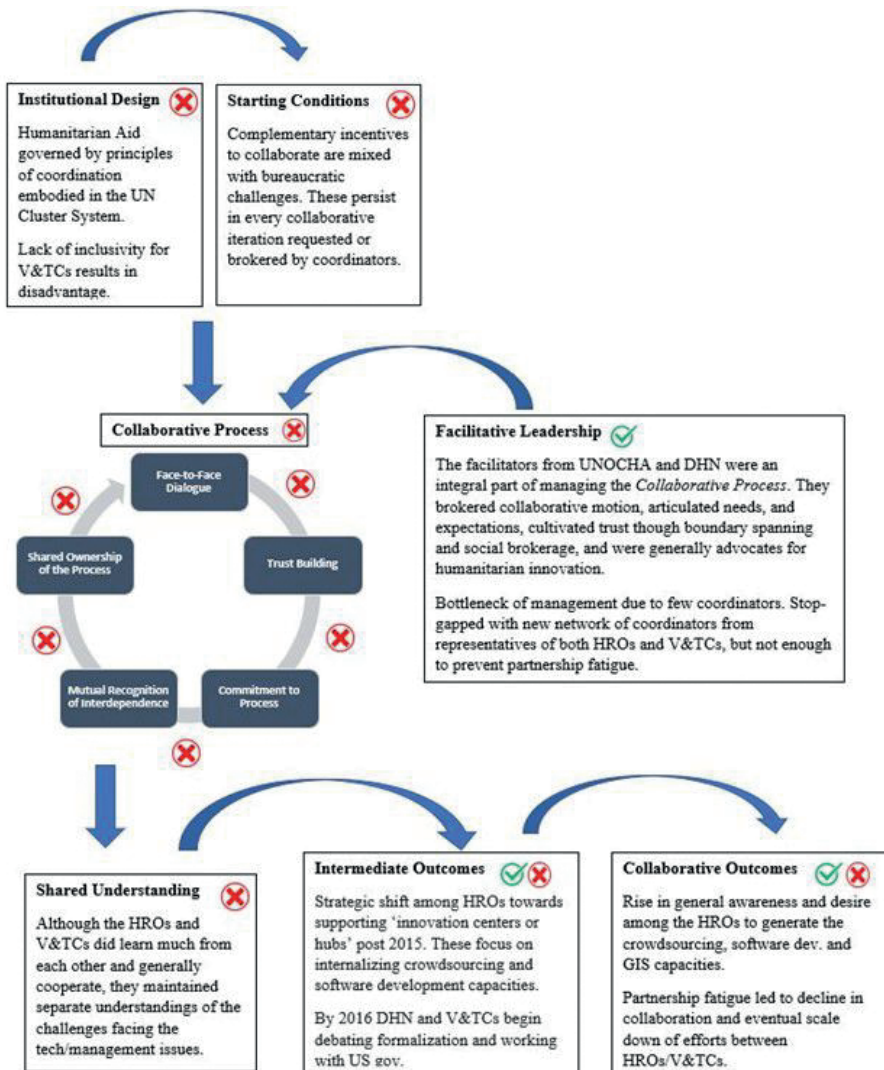
6.1. REMARKS ON THE CGM AND CASE STUDY FINDINGS

The use of Ansell and Gash's (2008) Collaborative Governance Model (CGM) helped make sense of the causes of the failures between the HROs and V&TCs, but it is evident, not optimal parts the study. What makes this study interesting is that the model shows a linear, input-output model, which does not quite hold in the case study. The findings show that both actors were unprepared to collaborate significantly, and they had to be incentivized to come together. Overall, the CGM provided a framework to structure the data to view different relationships between the model's variables. However, it does not provide enough guidance for understanding how Collaborative Governance can be established in non-linear ways. The chapter offers two significant contributions: (1) theorization of how the CGM can be adapted to study non-linear collaborations and (2) contributions to the related literature. This section theorizes how to adapt the CGM to investigate the collaborative failures' sources in light of the findings.

6.1.1. Failure Cascade in the Collaborative Process

Viewing Ansell and Gash's (2008) model once more, we can view the previous chapter's data as indicators of what parts of the HROs/V&TCs collaborations were successful and which were failures. Figure 13 shows systemic challenges that cascaded from one variable to the next and showed the underlying issues that precipitated them. For instance, the Institutional Design and Starting Conditions' poor inclusivity were fundamental issues to the cultivation of *Trust* and *Commitment* among the HROs and V&TCs. These had a cascading effect that delegitimized the *Collaborative Process*. Therefore, to salvage the collaborations, the UNOCHA and DHN had to intervene with a more direct approach as *Facilitative Leaders* and enroll members into activities and events that generate genuine trust and strengthen the *Starting Positions Shared Understanding*. Figure 18: illustrates this cascade and explains the effect of each failed variable:

Figure 18: Evaluation of the Case Study with the CGM



Own Illustration

The coordination network's creation involved new arrangements from previously established networks on both sides, basically comingling those networks into one. Unfortunately, this process was halted due to partnership fatigue and changing strategies for unilateral development of ICTs by the HROs. Likewise, the V&TCs also disengaged and began more inclusive work with the United States Government. Therefore, the CGM helped discover the lesser-known management gap accompanied by the technical gap of adapting the V&TCs to the HROs. However,

it did not offer a means to explore enrollment through social brokerage by the coordinators. The following sections will elaborate on two main points regarding the usefulness of the CGM in this study: (1) the effects of the failure cascade and (2) the measures taken by the UNOCHA and DHN to establish a link between *Trust Building* and *Shared Understanding* to the *Starting Conditions* and how that took place.

6.1.2. Incompatible Institutional Design and Poor Starting Conditions

The *Collaborative Process's Institutional Design* was based on the existing framework for humanitarian coordination, the UN Cluster System. In that system, V&TCs struggled with representation in setting the ground rules for collaboration. DHN's founders assumed that the HROs would naturally gravitate towards collaboration since the growing popularity of crowdsourcing and GIS systems had reached significant attention among the donor establishment of the humanitarian aid sector between 2010-2012. Thus, the UNOCHA and DHN invented the Digital Activation Protocol, in which the HROs would request collaboration based on their 'need' for new sources of information and sensemaking. However, unbeknownst to the DHN in the early years, the HROs often did not know their information needs until their people arrived in a disaster's humanitarian deployment zone.

The 'need' for information includes what type of data the HROs will need and its collection and validity. The methods used to determine these are negotiated through *Face-to-Face Dialogue* within the basecamps among representatives of the humanitarian aid sector, e.g., NGOs, non-profit organizations, donors, local governments. So, without adequate representation in the field, the DHN could not exercise *Face-to-Face Dialogue* to demystify the V&TCs, nor could they meaningfully participate in the conversations about information needs.

Recall that the core of the V&TCs' operations centered on remote support. It was challenging for V&TCs to represent themselves during a disaster in direct dialogue. Additionally, explained earlier, the only time during which the V&TCs could effectively advocate and showcase their capacities was during the disaster response phase of a humanitarian deployment. Although there were Crisis Mapping Conferences between 2010-2015 where members of the HROs and V&TCs could meet, the humanitarian deployments were still the best collaborative forum regarding access to the humanitarian aid sector and the aid beneficiaries V&TCs claimed to champion. The humanitarian deployments were not ideal for opening new dialogue and setting ground rules for negotiating the complexity of comingling networks and their ideologies. Thus, the *Collaborative Process* was disadvantaged from the beginning by poor inclusivity preceding a cascade of fundamental failures.

Unsurprisingly the *Starting Conditions* for collaboration were also disadvantaged due to poor inclusivity of the V&TCs in the *Institutional Design*. That meant that the qualification for being a legitimate actor of humanitarian aid was determined by their level of accountability within the UN Cluster System. Since the V&TCs were not accountable to donors or other constituents such as the aid beneficiaries of humanitarian deployments, they did not technically have a stake in that system. Therefore, the V&TCs could only be contributors to humanitarian aid in the eyes of the HROs and had to compete among the milieu of potential actors in humanitarian deployments, most of which directly accessed the HROs in the basecamps. Even with the establishment of the DHN, the V&TCs lacked sufficient coordinators to engage in *Face-to-Face Dialogue* in the traditional sense.

The DHN also had fierce internal debates among the V&TCs on the extent of their involvement in the humanitarian aid sector. Despite their identification with the horizontal and decentralized structure of open-source communities such as *Wikipedia* and *Occupy Wall Street*, V&TCs needed to recognize that in order to be sustainable, they must professionalize their activities. A disregard for governance structures can result in a hyper-political and detrimental power structure within a leaderless entity (Sabou and Vidolov, 2016). In other words, the DHN established the means for organizing leadership and coordination across the diverse V&TCs but struggled to overcome the complications of non-inclusivity in the UN Cluster due to its decentralized structure and diverse interpretations among its members regarding the V&TCs' credibility.

Generally, the HROs depended on professional cadres that formed out of repeated interactions in crises, e.g., working groups and inter-organizational teams working side-by-side in the basecamps and experiencing the same stress levels, and snap decision making amid a continually changing picture of the field. As Meyerson and colleagues noted (1996), such high-intensity environments often led to personal bonds between disaster professionals and enabled faster responses to mounting challenges and uncertainty. While the *Face-to-Face Dialogue* problem with the V&TCs was partially overcome through the coordinators' intervention, the CGM did not offer a means to account for how the *Starting Conditions* could be improved. Thus, significant pressure was placed on the UNOCHA and DHN to generate the conditions for effective collaboration against the backdrop of an incompatible *Institutional Design*.

6.1.3. Over-reliance on Facilitative Leadership

As previously mentioned, the HROs rely on professional cadres that build strong relationships with one another in recurring emergencies. These fundamentally built on *Face-to-Face Dialogue* served as a pathway for establishing and building trust through shared experience. However, the V&TCs were unable to achieve this mostly

and thus had to rely on DHN coordinators closely linked to UNOCHA. At a smaller scale, such as the early collaborations between UNOCHA and StandByTaskForce or MapAction or Ushahidi, the collaborations were effectively 'facilitated' or managed because the coordinators knew each other and could articulate the added value of the V&TCs directly. However, at a large scale, the sector-wide collaborative effort required much support from both the UNOCHA and the DHN. Consequently, three things happened: (1) an awareness gap regarding the V&TCs' existence, and (2) the UNOCHA had to intervene on behalf of the DHN as advocates of 'big data' in disasters and assist in convincing the HROs to collaborate, and (3) as UNOCHA began to successfully broker collaborations between HROs and V&TCs, the DHN faced with the additional problem of collaboration request overflow, to which the UNOCHA had to assist again with the management of those processes.

While the CGM did offer the means to investigate these problems through the data organization, it was insufficient for explaining some of the data's most exciting findings. One of these was the coordinators' network itself, as the individuals within induced trust synthetically to incentivize HROs and engage in virtual dialogue with the V&TCs. These were the beginning stages of developing a *Collaborative Process* that reflected the actors' dynamism and diversity.

Trust was an essential requirement for collaborations to succeed, and that the lack of Face-to-Face Dialogue was challenging to substitute with virtual dialogues. Although not technically impossible, virtual dialogues missed the critical element of shared circumstances for developing relationships among humanitarian professionals. To substitute this critical ingredient, the coordinators had to find a way to enroll their peers in untraditional dialogue with the V&TCs.

The coordinators also resolved to expand their network with the enrollment of members from both the HROs and V&TCs. Their goal was to informally introduce both sides and get them to engage in their own *Trust Building* activities. In effect, every member of both networks was a potential facilitator. The UNOCHA and DHN had to enroll them into their coordinator network to begin the slow gravitation of both toward one another. This budding coordination network was vital because it was essentially the only mechanism for sustained *Trust Building* in light of the poor *Starting Conditions*.

6.1.4. Reordering of the Networks to improve the Starting Conditions

The practice of enrolling new members to the coordination network from the HROs and V&TCs could not happen without the *Facilitative Leadership* to induce *Trust Building* in two phases: (1) the synthetic use of *swift trust* to incentivize the HROs to participate in the *Collaborative Process*, and (2) the cultivation of genuine trust via *Face-to-Face Dialogue* through the enrollment and reordering of relationships from

the HROs/V&TCs networks. The two networks' comingling could best be described as performative, entailing new members' enrollment into the coordinator network through the coordinators' social brokerage. The re-ordering and transforming of the two networks into a new network, and their inter-woven trust development processes was central to developing better *Starting Conditions*. The enrollments also involved integrating processes and practices that can be both bottom-up and top-down, and for which the CGM does not account.

There are two approaches to stable reordering: the first is the 'learning by making' approach based on developing inter-personal trust (Vidolov, 2014). This was partially orchestrated by providing guidelines on how the individual HROs and V&TCs could collaborate. For instance, the DHN developed guidelines in documents and technical artifacts¹³ to strengthen their *Shared Understanding* with the HROs, which further developed trust and feedback into the *Starting Conditions* while simultaneously generating credibility for the *Collaborative Process*.

The second approach is about co-participation in dialogue with a view of establishing "a formal channel for these groups to engage in a dialogue about the underlying problems of information management" (Harvard Humanitarian Institute, 2012, p. 13). According to the Harvard Humanitarian Institute (2012), the development of different initiatives such as 'neutral fora,' 'innovation spaces,' or 'research and training' consortia are necessary for mediating the discussions about everyday problems and experiment with tools and practices. Both approaches co-occurred with the reordering of the networks in late 2014- 2016.

Trust needed to be more genuinely established in *Face-to-Face Dialogues* and not just remain reliant on the coordinators' brokerage of relations and activities through swift trust. Thus, by mid-2014, various activities and events were established by the UNOCHA and DHN, such as the Crisis Mappers Conferences and various Hackathons, and research and training consortia hosted by several academic universities via the *Information Systems for Crisis Response and Management (ISCRAM)* Community. These opportunities were seen as leading to a straightforward operational interface that outlined agreed upon communication practices, standards, protocols, roles, and priorities. Within these practices, trust between the HROs and V&TCs became not so much about having a particular expectation about another's actions but about feeling less vulnerable about embracing change. So, subtly, the *Trust Building* approach was orchestrated from both the top-down and bottom-up approach to enable deeper *Shared Understanding* to provoke transformations to the actors' identities.

13 For more information see: Guidance - Digital Humanitarian Network (digitalhumanitarians.com/dhn/guidance)

The bottom-up engagements increased the familiarity and social capital between HROs in the field and the V&TCs and triggered new collaborative practices of mutual adaptation. For instance, the growing number of local collaborations between V&TCs and organizations like the *Kathmandu Living Labs* demonstrated the emergence of predictability and collaborative order that could be infused in diverse networks with trust from the bottom-up. The top-down approach similarly improved the reputation of DHN. It made it a representative to interface better with the HROs, which had become more open to new digital practices as a result. Simultaneously, these new practices disrupted existing institutionalized practices and entailed developing new identities and roles that could have led to the emergence of a qualitatively different network ordering between the HROs and V&TCs.

6.1.5. Trust Building and Time

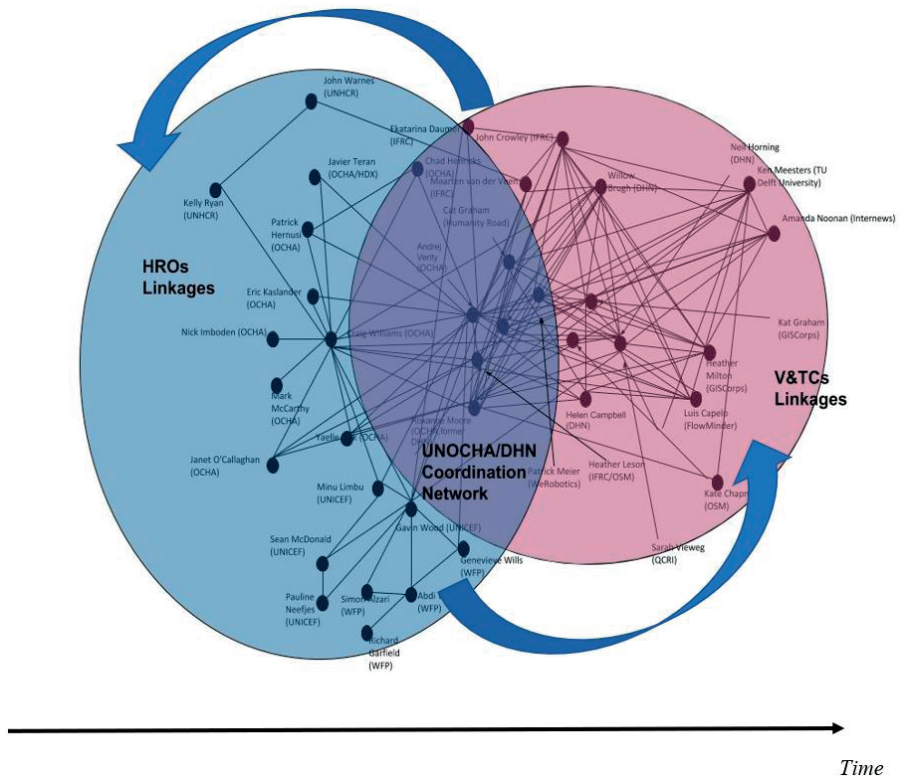
The original CGM was designed to study the processual and management reflections on collaboration and how it is governed. Thus, the model is a checklist of activities within a process that the actors are recommended to perform. Ansell and Gash's (2008) model assumes that participating actors come together out of some necessity and are fully prepared to collaborate; that time is not relevant. Although much of the literature warns that each variable could have negative consequences if actors act counterproductively, they rarely mention time (Gray, 1989; Chrislip and Larson, 1994; Tett, Crowther and O'Hara 2003; Blomqvist, Hurmelinna and Seppänen, 2005; Ansell and Gash, 2008; Emerson, Nabatchi and Balogh, 2012).

Trust Building in dynamic, unstructured, and non-commercial network environments requires quite a lot of time. The CGM does not offer much information on how *Trust Building* in high-intensity environments are observed and overcome in short and chaotic durations. While this practice might be irrelevant in an institutionalized and commercial context, the HROs and V&TCs operated in a highly dynamic, unstructured, and non-economic network environment (Sabou and Vidolov, 2016). That change pointed to the need for a negotiated articulation of the field's information needs and the available V&TCs' capacities. The more the coordinators could negotiate that articulation, the more they triggered the embracing of change and potentially new identities and roles.

As the findings explained, the early enrollments to collaborate were achieved through *swift trust* production by the coordinators' efforts through *social brokerage* and *boundary spanning*. These efforts helped develop trust in a synthetic sense, as the HROs were not necessarily trusting the V&TC but the coordinator's credibility. As Tatham and Kovács (2010) argued, commitments are often hastily formed due to the unpredictable nature of disaster events and that actors must quickly form trust between them to maximize their information sharing. Thus, *Trust Building* in the study took on an atypical form in that it was not cultivated over time but

produced in short and fast instances of collaboration. In this way, swift trust was essentially the stabilizing agent that enabled *Facilitative Leadership's* gears into a slow but persistent enrollment of individual HRO/V&TC members into the coordinator network. The larger the coordinator network became with every new relationship, the faster the two networks gravitated toward each other. Figure 19 shows Figure 11 again, albeit with the indication that if the two networks could have collaborated longer, they would have eventually merged and restructured, eventually strengthened the *Shared Understanding* and *Starting Conditions* of both networks into one mutual interdependent network.

Figure 19: Growth of linkages and reordering of the networks



Own Illustration

In figure 18, the arrows show gradual gravitation induced by the expanding relations of the coordinator network facilitated by the UNOCHA and DHN. As mentioned in the previous section, the reordering of these networks was facilitated in 'neutral fora,' 'innovation spaces,' or 'research and training' consortia such as the Crisis Mappers Conferences and hackathons, and the *Information Systems for Crisis Response and Management (ISCRAM)* Community. The events' frequency also

led to various DHN documents and technical artifacts to strengthen their *Shared Understanding*.

6.1.6. Lack of Shared Understanding and Unpreparedness

In 2015, there still was a lingering lack of contextual understanding about the V&TC's capacities for crowdsourcing and crisis mapping in disasters. Similarly, misunderstandings by the V&TCs persisted regarding the socio-cultural and geographic context of humanitarian deployments and the types and scales of processes for addressing them (Whipkey and Verity, 2015). Unfortunately, creating *Shared Understanding* through *Trust Building* events and activities was mired by two approaches to the actors' unpreparedness to collaborate. On the one hand, the HROs expected that the V&TCs would serve them with crisis mapping in exact, short, and relatively easy ways to add sensemaking toolboxes. Notice the term add rather than incorporate, as the former implies the HROs' preference for using information products produced by the V&TCs in a ready to access and optional variety. While aspects of visibility, competition, and donor accountability played a vital role in this preference, most collaborations failed due to continued neglect of the feedback cycle regarding initiated, completed, or abandoned collaborations.

As shown in the findings, several interviewees (e.g., A. Verity, personal communication, 3 November 2015; H. Milton, personal communication, 20 October 2015; R. Moore, personal communication, 20 August 2015; E. Diggle, personal communication, 27 January 2017; G. Wood, personal communication, 18 February 2017) generally agreed that feedback loops between the HROs and V&TCs were necessary, yet a process for feedback had never materialized. As a result, the attitude among the HROs towards the V&TCs became increasingly exacerbated from 2016 onward. Hunt and Sprecht (2016) also suggested that the leaderless structure of the DHN was somewhat to blame as the lack of accountability in humanitarian deployments was not typically well-received by HROs in the field.

Throughout the research, the leaderless structure of the DHN produced varied responses to the coordinators' attempts at brokering collaborations. The V&TCs' inability to formalize per the UNOCHA's recommendations was also evident. They were not sensitive to the humanitarian aid sector's bureaucratic reality, a sensitivity that HROs needed in all their potential partners. Furthermore, some literature dealing with Big Data in disasters (Starbird, 2011; Crowley, 2013; Meier, 2015) suggested that many V&TCs saw themselves as revolutionaries expecting a dramatic reform of the humanitarianism through ICTs.

Several interviewees (H. Campbell, personal communication, 10 November 2015; L. Nissen, personal communication, 4 December 2015; R. Moore, personal communication, 20 August 2015) also suggested that the formalization of the

DHN could have eased the tensions between the HROs and V&TCs and opened channels for funding and improve their credibility. Despite the potential benefits of moving away from a peer-to-peer open network structure, Verity and Link (personal communication, 3 November 2015; Y. personal communication, 4 November 2015) stressed the danger of preventing cross-organizational collaboration with unnecessary institutional barriers. In other words, some V&TCs were under legal restrictions that prevented their structuration, and forcing a significant formalization of the DHN would have alienated a majority of its members.

The UNOCHA and DHN coordinators eventually did succeed in establishing several activities and events where members from both networks could come together and pool their different interpretations about the meaning of the *Collaborative Process*. In this way, the HROs could more regularly articulate what the V&TCs can do for them in the context of a disaster. Similarly, the V&TCs did improve their ability to probe the HROs' needs, though with less frequency. HROs remained largely disinclined to troubleshoot the collaborations too much. This was tied to the HROs lack of bandwidth and institutional deterrents to spend their resources on V&TCs that were still experimental. At the same time, the V&TCs were already planning for the inevitable fallout of their partnership fatigue. The process of generating *Shared Understanding* had been too complicated and taken too long, approximately five years, starting with the V&TCs emergence in Haiti.

Between 2012-2015 the collaborations remained inconsistent due to a lack of preparedness within both networks. The lack of preparation was fundamental to the HROs willingness to collaborate with the V&TCs. Their principal concerns revolved around prior awareness of the V&TCs and the applicability of their capacities in humanitarian deployments. Although awareness and promotion of the benefits of V&TCs' capacities, such as crowdsourced crisis mapping, have increased, the inter-organizational structures between those supplying crowdsourced mapping data, the V&TCs and their intended 'clients'—the aid beneficiaries and the HROs, never fully matured.

Some of the interviews corroborate the problem of maturity (A. Verity, personal communication, 3 November 2015; Y. Link, personal communication, 4 November 2015; R. Moore, personal communication, 15 February 2016). These individuals pointed to the growing tension between the HROs and the V&TCs around notions of legitimacy. These tensions were further exacerbated when V&TC's began discussing providing crowdsourced crisis maps directly to local governments or militaries rather than the HROs in the latter years of their collaborations. Furthermore, the added departure of Andrej Verity to a new posting within UNOCHA exacerbated the tensions. Although the DHN survived a few more years without him, the UNOCHA's involvement in the collaborations declined significantly between 2015-2017.

Interestingly, *Shared Understanding's* problem due to unpreparedness is not considered in the CGM. Again, the model is straightforward, and it assumes that the actors participating in the process within it are static and stable partners. Ansell and Gash (2008) admit that achieving *Shared Understanding* can be tricky since actors must own the impetus for working together and aligning their core values. However, the model does not explain how developing a common framework can occur between unstable partners. As is evident from this study, the HROs and V&TCs only started to become stable in the fifth year of their collaborations and through the coordinators' direct intervention. The model misses the opportunity to map how unstable actors feedback their efforts into the *Starting Conditions* and potentially arrive at a *Collaborative Outcome* that changes and improves the *Institutional Design* of the *Collaborative Process*.

6.1.7. Adapting Commitments to a Shared Strategy of Preparedness

The CGM assumed that a strong interconnection between individual networks exists, or when it does not, then the impetus falls to the facilitator to leverage the actors into mutual compromises (Ansell and Gash, 2008). In the case study, that responsibility did indeed fall to the UNOCHA and DHN, and more specifically to the coordinators of both organizations who served as brokers, translators, facilitators, and most importantly, as leaders of the *Collaborative Process*. However, securing the collaborations' legitimacy depended on strengthening both sides' *Commitment to the Collaborative Process*, and in turn, securing these commitments required significant articulation work that could not be managed solely by the coordinators. In other words, the coordinators needed to enroll more members in events that occurred before the disaster response so they could engage in activities that strengthened their *Shared Understanding* of each other and the value of their collaborations.

Shared Understand varies in the literature, but it suggested that the level of *Commitment to the Collaborative Process* is evident in building trust and mitigating each actor's risks (Day and Gunton, 2003; Tett, Crowther and O'Hara, 2003; Ansell and Gash, 2008). The *Facilitative Leadership* via the UNOCHA and DHN had alleviated some of the pressures facing the HROs and V&TCs. For example, basic knowledge of big data and the sociological implications on the emergence of V&TCs had become somewhat better known by 2016. However, it is apparent that both HROs and V&TCs struggled to align their missions and failed to achieve *Mutual Interdependence* due to the poor articulation of (1) the HROs' information needs, (2) the V&TCs' available capacities and their added-value, and (3) a repeatable management approach to connect these. These issues exacerbate collaboration dynamics because the situation could not remain stable long enough for people to clarify their thinking about what is going on. Thus, much of the time, only a handful

of people had the requisite degree of sophistication needed to navigate the actors' different perspectives.

To overcome these issues, the HROs and V&TCs structured their collaborations by articulating both sides' concerns through the coordinators' efforts. The articulation concept is related to *boundary spanning* or 'speaking the language' of both sides (Strauss, 1985). In turn, the coordinators had to teach the individual representatives from both networks how to understand each other and learn from their underlying positions. In this way, they engaged a slow but steady process of comingling, which occurred more successfully outside of disaster settings and in the joint consortia hosted by the UNOCHA and DHN, e.g., the Crisis Mappers Community and ISCRAM.

Shifting the focus of HRO/V&TC engagements from disaster response to disaster preparedness was already taking shape in early 2016. They were becoming more productive toward establishing better *Commitments to the Collaborative Process*. In this way, the V&TCs such as *Missing Maps* and *StandByTaskForce* attempting to engage digital volunteers with preparedness efforts could better highlight their role without competing for attention during a disaster. However, as explained in the findings, 'bandwidth' among the HROs needed to be overcome, especially concerning experimental crisis maps (A. Verity, personal communication, 9 December 2016). Thus, the V&TCs needed to reduce the time needed to matchmake information needs on the ground with available capacities and added value, which meant aligning both sides' strategies towards their mutual preparedness to collaborate.

The strategic alignment of both sides' interest to collaborate lay in their *Shared Understanding* and was supported through *Intermediate Outcomes*. As explained earlier, the creation of documents and artifacts that guided actors through collaboration helped generate a clearer picture of how HROs and V&TCs should deal with each other (Capelo, Chang, and Verity, 2012; Whipkey and Verity, 2015). Furthermore, and perhaps more importantly, establishing training activities and consortia was most important for developing a shared preparedness strategy. These artifacts and consortia were the *Intermediate Outcomes*, but they still did not solve the collaborations' legitimization through *Shared Understand*.

The *Commitment to the Process* is also linked to the notion of inclusivity and reducing the requirements for potential collaborators to participate. Huxham and colleagues (2000) argued that some individuals involved in collaboration mainly act personally, while others act on behalf of agencies. Some individuals may also notionally represent multiple organizations or other collaboratives while interacting in daily cross-organizational contexts. In the case study context, the qualification for who should be represented in the consortia must involve a venue where members

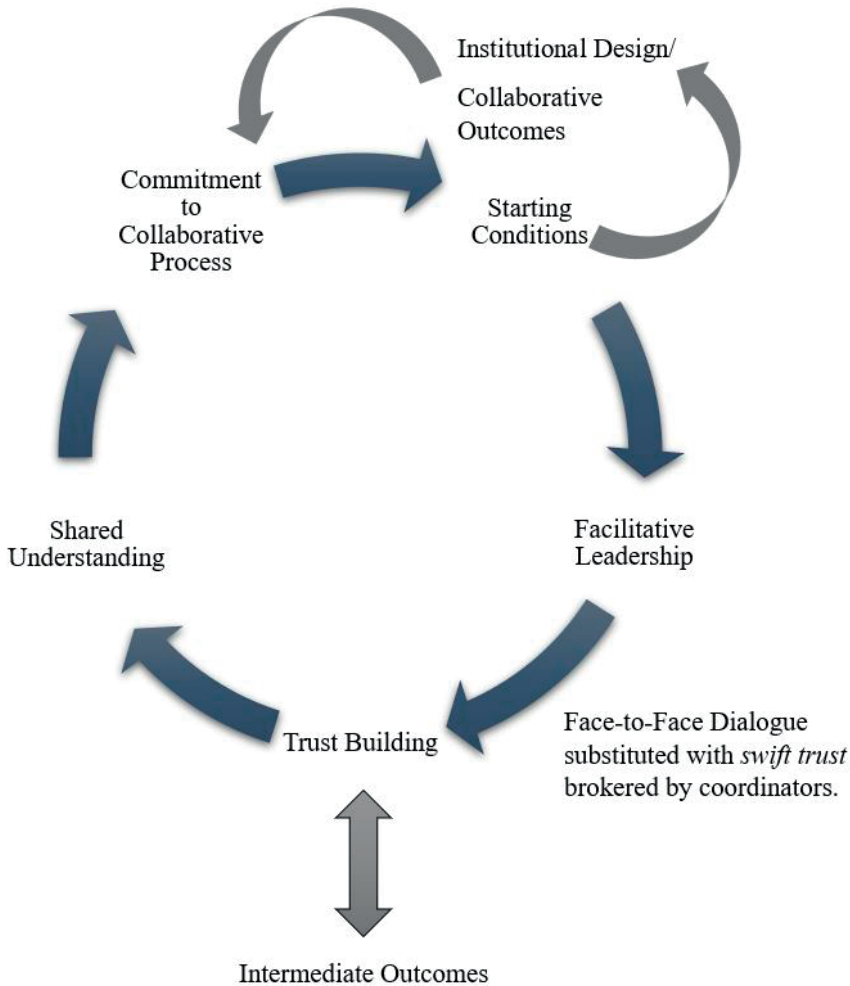
can inclusively engage in the agenda-setting. The agenda-setting consortia s can be hosted virtually, but building commitments will take much longer and carry more risk for the *Facilitative Leaders*. On top of' this, environmental conditions such as *Power/Knowledge Asymmetries* and *Internal/External Pressures* will be continually changing as unstable actors become more stable through their networks' reordering. As that occurs, they will also develop more *Intermediate Outcomes* that strengthen *Shared Understanding*. Through these, their *Commitment to the Collaborative Process* also strengthens as the collaborations' purpose becomes more transparent and governable. These will then feedback into the *Institutional Design* and *Starting Conditions*, which also structure and reinforce commitments according to the actors' needs, thus shaping the CGM from an input-output process to a cyclical process.

6.1.8. Theoretical Contribution to the CGM

As stated at the beginning of this chapter, Ansell and Gash's (2008) CGM is an input/output process that assumes actors will achieve their aims linearly. However, the collaborations between the HROs and V&TCs were non-linear and not well designed for inclusivity. In light of this, the case study actors had to establish a new basis for collaboration detracted from the original input-output model of Collaborative Governance. Thus, while developing information products in humanitarian deployments, the HROs and V&TCs engaged in a limited cycle of feedback facilitated by the UNOCHA and DHN coordinators.

As the two networks comingled and reordered, the *Collaborative Process* began to reshape to fit the feedback. Although the reordering came late in the collaborations, they did begin informing the *Institutional Design* and *Starting Conditions* that made up the framework for their joint activities. In this way, the *Collaborative Outcomes*, which were meant to be the information products themselves, began to include solutions for managing their creation and delivery. In this way, the collaborations lessened their emphasis on producing viable information products for the humanitarian field and became more concerned with achieving sustainable, long-lasting collaborations. As this repeatedly occurred through facilitated interaction and articulations, the CGM itself also took a new form. In figure 20, the model is reshaped as a cyclical process representing how non-linear collaborations can reshape the original input/output design of the CGM.

Figure 20: CGM adaptation post-study



Own Illustration

The adapted model assumes that actors that are unstable or unable to engage in *Face-to-Face Dialogue* and genuine *Trust Building* must substitute their incentivization with a synthetic form of trust. In either case, time is an essential factor as actors may not engage in prolonged engagements yet cannot establish genuine trust and refine their commitments without an abundance of both. Thus, the *Facilitative Leader's* role becomes crucial, as he will use his credibility to induce *swift trust* among his peers and bring their respective organizations to the table. This synthetic form of incentivizing actors to buy into collaborations will occur until either there are enough members who join the growing network of collaborators or the actors succumb to partnership fatigue and disengage. Assuming the former is

true, the model continues by showing that genuine *Trust Building* will begin through the shared experience of troubleshooting the *Collaborative Process* with consistent feedback. Through consistent feedback, more actors may see their values and their strategies align and strengthen *Shared Understanding*.

Additionally, any *Intermediate Outcomes*, such as the generation of documents, technical artifacts, joint activities, and consortia, will strengthen *Shared Understanding* and *Trust Building* and bring legitimacy to the *Collaborative Process*. Finally, the *Commitment to the Collaborative Process* will also remain adaptive until a stable order to the collaborative network is determined. That involves much articulation work between the actors to inform the *Shared Understanding* between them and feed their results back into the *Institutional Design* with each new *Collaborative Outcome*, e.g., an inclusive policy change.

The cycle will continue until the *Institutional Design* itself is reshaped to fit the actors' network order and include all participating actors as formal stakeholders of the *Collaborative Process*. Therefore, the CGM adaptation shows how actors can influence the *Institutional Design* and *Starting Conditions* of the *Collaborative Process* to fit their needs despite the environmental factors. So rather than a set framework for achieving *Collaborative Outcomes*, the CGM can also be reimagined as a cyclical process that lessens the original model's rigidity and accounts for better inclusivity.

6.2. CONTRIBUTION OF THE STUDY TO THE LITERATURE DOMAINS

The following sections discuss this study's contributions to the literary domains dealing with Collaborative Governance in Crisis Management, Big Data, Crowdsourcing and Sensemaking within Humanitarian Aid, and Digital Humanitarianism. The findings show that a significant part of the collaborative failures had to do with skepticism about the potential of big data in humanitarian aid. In the context of digital humanitarianism, big data has raised important questions concerning its management, which affect the decision making of those involved in the provision of humanitarian aid, especially in contexts and relationships characterized by inequality and power. The emergence of crowdsourced crisis mapping in an era of digital connectivity does not take away fundamental human instincts for offline interactions. Considering the present pervasiveness of ICTs in everyday life and the wake of the global COVID-19 pandemic, it is logical to surmise that digital communication and collaboration will become more persistent. Therefore, the study of how societies develop online relationships with their mandated agencies and engage in digital humanitarianism is perhaps more applicable now than it has ever been.

6.2.1. Collaborative Governance in Crisis Management

The concept of Collaborative Governance provides useful insights into treating collaborative platforms as generic policy change methods (Emerson and Nabatchi, 2015; Nisar, 2018; Ansell et al., 2020). Much focus on these has been placed on building an organization-theoretic approach to collaborative platforms defined by organizations or programs with dedicated competencies and resources for facilitating the creation, adaptation, and success of multiple or ongoing collaborative projects or networks (Ansell and Gash, 2018). Much of the literature on Collaborative Governance focuses on success stories to demonstrate the importance of the theory and its associated methods of deriving inclusivity among actors in complex societal problems (Huxham et al., 2000; Ansell and Gash, 2008; Emerson, Nabatchi and Balogh, 2012; Ansell et al., 2020). The study in the manuscript is fascinating because it considers a story of collective failure and articulates its causes.

The case is interesting because, from the very beginning, the environment was not conducive to Collaborative Governance, but the HROs and V&TCs tried it regardless. Furthermore, they succeeded in part by having made an imprint on the humanitarian aid sector, giving rise to questions about how much inclusivity should be allowed to V&TCs considering the importance of cross-organizational collaboration in crisis management. Public decision-makers and managers increasingly use collaboration in networked forms of governance to address complex public problems. The study of these is essential as more organizations become connectors across the public and digital spheres (Hunt and Sprecht, 2016).

The process entails building trust between participants, developing a shared understanding of the problem via deliberation and negotiation, and developing the resources, capacity, and leadership to support engagement (Ansell and Gash 2008; Bryson, Crosby, and Stone 2015; Emerson and Nabatchi 2015). By linking network structure to collaborative dynamics, the study in this manuscript helps elaborate potential mechanisms for the better structuring of Collaborative Governance.

Accompanying Collaborative Governance's proliferation are calls to evaluate better its performance (Innes and Booher 1999; Thomson, Perry, and Miller 2007; Thomson, Perry, and Miller 2009; Thomson, Perry, and Miller 2009; Emerson, Nabatchi, and Balogh 2012; Emerson and Nabatchi 2015). Collaborative Governance's outcomes are theorized to emerge from interpersonal and inter-organizational dynamics like principled engagement amongst participants (Emerson and Nabatchi 2015). For instance, Ulibarri and Scott (2017) found that patterns of connections between multiple networks are more hierarchical in less structured collaborations, suggesting asymmetrical interactions between active versus passive members.

The principle of Collaborative Governance relies on the members' diversity to harness their synergy into a structured form (Huxham et al., 2000). In crisis management, new methods, such as crowdsourced crisis mapping, have become a principal difficulty connecting and facilitating the information and task sharing across the technical and humanitarian spheres. Over the past two decades, new collaborative approaches to governing and managing these have developed. Changes from 'old-style' bureaucracy to that of the networked society have been theorized and studied (Morse & Stephens, 2012).

The model's adaptation shown earlier generally supports the supposition that Collaborative Governance leads to better performance outcomes when the collaborating actors identify the involved mechanisms that mitigate their risks and establish trust through member enrollments to a shared network. Likewise, the same can apply to crisis management's potential, as highlighted by studies about the digital humanitarians' work (Muhren and Van de Walle 2010; Starbird and Palen, 2011; Meier, 2015).

The study found that effective strategic intermediation occurs in unstructured collaborations via facilitators who take on an exceptionally significant role to help morph the structure to fit the actors' inclusion needs. Thus, Collaborative Governance can be modular in that the actors that engage in it will continuously refine the structuring of their collaborations if given time and guidance. However, in instances where time is limited, such as in the case study, then Collaborative Governance's modularity becomes more critical. Therefore, synthetic inducements of trust through *social brokerage* help enroll actors in dialogue, but only insofar as the leaders can affect. The case study also showed that partnership fatigue and individual organizations' strategies also have a tremendous impact on whether Collaborative Governance will continue.

The relationships between the HROs and V&TCs were often built upon inconsistent, personal connections between coordinators and their networks. These formulations led to significant collaboration issues between them, an issue identified as a 'cultural divide' by some researchers (Nelson and Sigal, 2010; Hunt and Sprecht, 2016). This collaborative barrier is further compounded by a prejudicing of humanitarian innovation over integration, with two cultures at odds getting in the way of improvement to service and sensemaking. On the one hand, the V&TCs seek new ways of doing things and revolutionizing others, which conflicts with the HROs' traditional integration of techniques across the aid sector (Munro, 2012). By linking network structure to collaborative dynamics, the study in this manuscript helps elaborate potential mechanisms for the better structuring of Collaborative Governance. Furthermore, researchers can apply Collaborative Governance to study

the network dynamics of V&TCs and the sociological and policy outcomes that resulted from the digital humanitarian phenomenon.

6.2.2. Big Data, Crowdsourcing, and Disaster Sensemaking

A significant part of the collaborative failures shown earlier also has to do with skepticism about the potential of big data in humanitarian aid. Before the UNOCHA and DHN's intervention, the HROs knew little about big data and its potential to enhance sensemaking in humanitarian deployments. For instance, in most HROs, their operations are highly dependent on negotiations and leverage with NGOs, donor agencies, non-profits, and militaries that control the sensemaking resources that inform decision-makers (Bontis, Crossan & Hulland, 2002). These aim to capture the full range of "legitimate" human experience and, by effect, isolate outliers (Burns, 2017, p. 3). Thus, decision-making in the humanitarian aid sector reduces sensemaking to people experiencing *kinds* of situations and places (Bowker and Star, 2000) whose stories are better captured by the best-positioned organizations to understand them, e.g., HROs, NGOs, donors.

By excluding other kinds of stories, such as those collected from social media, "those people become more real" and their needs more tangible (ibid, p. 81). In other words, HROs generally do not view open-source data as legitimate because it is much harder to verify and articulate than the data provided by their traditional partners. The HROs leverage data about aid beneficiaries based on their social, political, and economic needs and the differential influence and authority in the basecamps and the host country's government (Burns, 2017). The differential influence, of course, masks the humanitarian aid sector's history of contestation and negotiation.

The capacity of V&TCs to collect, process, and share disaster data from open sources has been an issue that has persisted in the humanitarian aid sector (Roth and Luczak-Roesch, 2020). While the V&TCs were able to capture information directly from disaster-affected communities, it raised the problem of how to process these vast additional datasets and by whom the potentially enormous task should fall to ensure data can be verified (H. Campbell, personal communication, 11 November 2015). In the context of digital humanitarianism, big data has raised important questions concerning its management and data analytics, which affect the decision making of those involved in the provision of aid, especially in contexts and relationships characterized by inequality and power, such as aid relationships (Roth and Luczak-Roesch, 2020). Therefore, to better understand the applicability of big data in humanitarian aid, it is crucial to consider who is included and excluded from the sensemaking processes.

The V&TCs had developed many services to empower disaster-affected communities in their relief (Chernobrov, 2018; Cotton, 2020). However, there is

also criticism of whether their innovations really “spark meaningful change or simply feed self-indulgent forms of pseudo-participation” (Papailias, 2019, p. 1054). Despite previous recommendations from the Harvard Humanitarian Initiative (2011) to undertake joint investigations into best practices, little was done to realize these suggestions. Bott and Young (2012) summarized the barrier to the issue of incorporating V&TCs as “both the strength and weakness of crowdsourced mapping and open-source data collection ...derives from its participatory openness” (p. 56). Thus, the collaborations failed because alternative interpretations of sensemaking derived from open sources are generally incompatible with the existing culture of information management in humanitarian aid.

The collaborations' messiness and limited availability of the coordinators to manage them ultimately meant that the Collaborative Process was prone to manipulation. That led to the inability to utilize big data in sensemaking remained undeveloped. In other words, the notion that big data could enhance humanitarian sensemaking remained on the periphery of the HROs because decision making was not solely the result of bureaucracy but also security, context, and personal beliefs (Burns, 2017). The results suggest that a lack of time or space to assess new data sources led to hesitation about utilizing such methods as a crowdsourced mapping in humanitarian deployments. Andrej Verity recalled the first-time crowdsourced mapping that came to his attention during the Haiti earthquake in 2010. It was an exciting gold mine of data but too unstructured and loose to be used (e.g., A. Verity, personal communication, 9 December 2016). By 2016 these kinds of capacities and the general utility of big data became increasingly dismissed.

The issues raised over a decade ago are still apparent today. The HROs have become more aware of the technical gap concerning their ability to use [big] data generated by their beneficiaries. Nevertheless, the deluge of ICTs and actors in the humanitarian aid sector has narrowed their limited bandwidth further and resulted in a general disregard for crowdsourcing and crisis mapping capacities. For instance, Link (personal communication, 4 November 2015) expressed how problematic additional [big] data integration could be amid a crisis for responders who are already overstretched in their day-to-day tasks. HROs also held expectations surrounding the data they were willing to accept, principally based on past experiences or data presented by reliable sources such as host-governments and other NGOs.

Furthermore, the data required by HROs varies dramatically across crises, and often responders were unsure of their immediate information needs (Hunt and Sprecht, 2016). This made it difficult to predict whether crowdsourced data could be immediately useful and usable (H. Milton, personal communication, 20 October 2015). Therefore, professional humanitarians are less likely to initiate collaborations without influential leaders such as Andrej Verity or the DHN coordinators to

articulate how crowdsourcing or other methods could be utilized. Their departure also contributed to the general dismissal of such capacities as crowdsourcing, crisis mapping, software development, and many apps and technologies created by the V&TCs.

It is perhaps understandable that crowdsourced crisis mapping cannot automatically be utilized within the fluid contexts of disaster response, especially in the humanitarian aid sector. In contrast, there are contexts where there is such minimal data available to responders that any data becomes highly valuable (Meier, 2015; Whipkey and Verity, 2015). The increased use of open data sharing, free flow information, and collective participation are all strongly ingrained into the practice of crowdsourced crisis mapping. These characteristics are part of an emergent open movement pattern, including the Open Source Initiative, Open Data movements, and Digital Humanitarianism (Stauffacher et al., 2012). However, these do not fit well with the existing structures within the humanitarian aid sector, leading to the lack of crowdsourcing and big data for official sensemaking.

Meier (2015) contrasted the 2015 Nepal experience with leading responders' openness during the 2012 Libya crisis, and the subsequent integration of crowdsourced crisis maps at an elevated UN management level. Following the 2015 Nepal Earthquake, many V&TCs were disheartened to learn that their crowdsourced maps were not utilized in the crisis. Both Meier (personal communication, 21 January 2016) and Verity (personal communication 6 December 2016) attributed this failure to the personal opinions of leading in-country responders, which determined the application or dismissal of crowdsourced [big] data.

As Link (personal communication, 4 November 2015) highlighted, the difficulties with sharing data, even at an inter-organizational level, are compounded due to concerns over privacy and security. During humanitarian deployments, privacy and verification issues are heightened due to the weight of decisions in the field, making it even harder to integrate individual flows of information from unverified sources (Reidenberg et al., 2013). Similar observations were made by Specht and Hunt (2016), noting an apparent lack of internal openness within the HROs, and even more restrictive processes in inter-organizational settings. Whipkey and Verity (2015) also highlighted concerns of humanitarian professionals in trusting unverified information, particularly in the current climate where donors' financial input is often precarious and formal leaders are unprepared to consider external risks collaboration.

Despite the prevalence of top-down hierarchical structures in the HROs, there was a growing number of individual connections between players at various levels of this hierarchy. This movement among individuals to work in flattened information

sharing structures and communication conflicted with the traditional systems of information management constructed to move information up and down hierarchies (Duffield, 2013). Thus, the very “different modes of production, processing, curation, and representation of people, places, and knowledge” produced by the V&TCs was fundamentally incompatible with the more rigid interpretations of the HROs (Burns, 2013, p. 53).

The literature dealing with big data in disasters suggests that many V&TCs saw themselves as revolutionaries expecting a dramatic reform of the sector through ICTs (Crowley, 2013; Meier, 2015). These two motivations were evident in the *Power/Knowledge Asymmetries* and *Internal/External Pressures* that nearly made up both actors' group identity: HROs and V&TCs. These identities were very significant for adopting new capacities and the generalization of big data in humanitarian sensemaking. Because these conflicted, the HROs and V&TCs fell into repetitive cycles of failure that resulted in partnership fatigue and disengagement. The disengagement result was that the DHN disbanded, pushing the V&TCs to be more responsible for their representation.

While at the same time, the HROs have attempted to address the usefulness of big data outside the actual spectrum of humanitarian deployments. That means that the HROs have internalized their ICT developments between 2016-2020 (Besiou and Van Wassenhove, 2020). However, in the face of changing political landscapes among their donors and reduced funding, their ability to develop their crowdsourcing maps and big data-related applications has stagnated. In summary, the humanitarian aid sector's ability to sensemaking in disasters is closer to the antiquated methods preceding the Haiti response in 2010 than at the height of their collaborations with the V&TCs. As Meier (personal communication, 21 January 2016) pointed out, “this is a human story, not just a technical one,” and the human side of big data in disaster sensemaking is still a worthy issue for research.

6.2.3. Digital Humanitarianism Beyond the Humanitarian Aid Sector

The findings in this study show that a lack of preparedness hinders collaboration and context. As new methods, such as crowdsourced crisis mapping, have emerged in the humanitarian sphere, a principal difficulty is how to connect and facilitate information and task sharing across the technical and humanitarian spheres. Several interviews (A. Verity, P. Meier, L. Nissen, P. Hernusi, R. Moore, H. Leson, personal communications, 2015) revealed that it is not always an unwillingness to embrace new ICTs that was at fault, but that coordination and cooperation were problematic due to a lack of bandwidth to understand the V&TCs. Similarly, the efforts of the DHN were insufficient to articulate their usefulness or their potential to grow as part of the humanitarian aid sector.

On the one hand, the HROs have resolved to focus their ICT developments internally amid shrinking budgets and growing donor pressures. On the other hand, the V&TCs have gone through an existential evolution following the dissolution of the DHN in 2019. As Burns (2014) predicted, the formalization of the DHN would inevitably mean that most V&TCs would have to seek alternative venues for achieving their goals. At the same time, those who appeared in Haiti with the most substantial promise of the digital revolution have become NGOs or non-profits. While groups such as MapAction, humanitarian OpenStreetMap, and Ushahidi are still not formal stakeholders of the humanitarian aid sector, they are well known and continue to be a presence in it. Paradoxically their failure in the first decade of the digital humanitarian phenomenon has resulted in both HROs and V&TCs recognizing the sources of that failure.

Additionally, a lack of contextual understanding was a considerable barrier to the use of crowdsourced data, including misunderstanding of the socio-cultural and geographic context of a crisis and the type and scale of the emergency. For example, the 2016 Ecuador earthquake and the 2015 Nepal earthquake both attracted a significant number of V&TCs, yet integrating crowdsourced data varied greatly. Link and Moore (personal communication, 2015) attributed the preparedness on the ground to pre-established connections between HROs and V&TCs, which were not present in Nepal.

The shift of exploring big data to disaster preparedness relies on a networking system that currently does not exist. Unfortunately, amid the structuring of such a network, the HROs and V&TCs shifted their priorities toward downscaling their collaborations compounded by key individuals' departure. Despite multiple investigations into the 'psychology of preparedness,' there are limited conclusions on which triggers incite people to prepare effectively (Hunt and Sprecht, 2016; Solís, et al., 2020). Principally, it lacked collaboration and communication amongst HROs and V&TCs and lacked understanding of when and why to utilize crowdsourced data.

While research on the applicability of digital humanitarianism in the humanitarian aid sector is a significant issue, the reluctance to investigate failures within the humanitarian aid sector appears to root in psychological and financial factors. Moore (personal communication, 9 December 2016) explained that organizations' psychological pressure to meet donor expectations or risk losing funding was a core issue among humanitarian professionals. Verity (personal communication, 9 December 2016) corroborated that notion recalling that the 'failure' of crowdsourced maps to be utilized in the Nepal response was deliberately not advertised so that V&TCs that had dedicated so much of their time would not be disheartened. Past crowdsourced mapping operations should have been analyzed to improve

crowdsourced data processing, validity, formatting, sharing, utilization, and feedback, whether utilized or not. Unfortunately, Moore (personal communication, 20 August 2015) and Verity's (personal communications, 3 November 2015) correlations relate to some humanitarians' unwillingness to do as linked to their unwillingness to acknowledge the possibility of failure fear its consequences on them and their organization.

The emergence of crowdsourced crisis mapping in an era of social media, web forums, and blogging does not take away fundamental human instinct for interaction, and professional humanitarians continue to struggle at building online working relations, relying more on offline connections (A. Verity, personal communication, 9 December 2016). As the study in this manuscript found, face-to-face connections are crucial in the humanitarian aid sector. They facilitate trust and collaboration better than online ones (Y. Link, personal communication 4 November 2015). However, this does not mean the abandonment of digital humanitarianism because of a human predisposition to trust those professional humanitarians working in the field. Instead, whether in-person or online, partnerships, like emergencies, need a better preparedness level to collaborate online (Hunt and Sprecht, 2016). "Those V&TCs that successfully collaborated with the formal humanitarian system were those that developed relationships before the crisis" (Milner and Verity, 2013, p. 47).

The midst of a crisis is not the time to establish communication structures for information sharing, nor is it necessarily one in which it is appropriate to build comprehensive relationships (J. O'Callaghan, 24 November 2015). Compromise is essential to adapt their networking structures to facilitate collaboration through transparent information sharing, data standards, joint impact measurement, and constructive, proactive discourse. V&TCs may well have had a pivotal role in the evolution of the humanitarian aid sector, but the time and effort needed to be invested in structures in which formal organizations can utilize the online crowd's power should have been established through intermediary offline connections.

Coordinators from the technological and humanitarian sphere need to be engaging in dialogues to ensure better accuracy of crowdsourced data through the introduction of open data policies and verification strategies (N. Horning, personal communication, 19 November 2015). Technology is generally advancing faster than the human capacity to adapt to it. A common ground needs to be established between digital humanitarians and any institutionalized actors with whom they seek to collaborate. Toward that end, there needs to be better prepared to collaborate across inter-organizational spheres of management and technical expertise.

Drawing on the Nepal response experience, some interviewees (A. Verity, personal communication, 3 November 2015; H. Milton, personal communication,

20 October 2015; R. Moore, personal communication, 20 August 2015; T. Doyle, personal communication, 18 November 2015) suggested that their collaborations' regionalization would benefit from better, in-depth research and feedback loops. The feedback loops were a change that many members of the DHN believed could improve data quality and analysis during crises. Rather than seeking ever newer solutions, working models that tie in feedback to the larger framework for collaboration can be improved through establishing data standards, enabling crisis information to be presented in a digestible way (N. Horning, personal communication, 19 November 2015). This might have improved the HROs' willingness to utilize new [big] data sets from the V&TCs and prolonged their collaborations longer had they been better managed.

Despite the admirable efforts of the UNOCHA and DHN to connect HROs and V&TCs and bridge the technical and humanitarian divide, there is little evidence as to the success of this endeavor (P. Meier, 21 January 2016). Beyond this, the humanitarian aid sector needs to improve transparency and research into its failures. It is no longer sufficient to write retrospective crisis reports; instead, humanitarian processes need to include ongoing analytics and data manipulation, providing up-to-date feedback to data providers (Moore et al., 2016). Researchers can play an imperative role in this regard by evaluating innovations in real-time to provide comprehensive crisis analysis (Verity and Whipkey 2015).

Although digital humanitarianism is no longer as prominent to research as it was in 2015, there are still some that find its continuation interesting (Norris, 2017; Chernobrov, 2018; Solís et al., 2020). For example, Burns (2019) has found that the current state of the art involving digital humanitarianism is increasingly taking place through capitalist philanthropy whereby private businesses are finding ways to support organizations such as StandbyTaskForce. This has ultimately led to humanitarian and state institutions re-articulating ways that V&TCs can help in disasters. One potential approach to situating digital humanitarianism within these conversations is through the research on the knowledge politics of data and humanitarianism.

Burns (2017) claimed that "knowledge politics" refers to "how individuals and institutions leverage digital spatial data and spatial technologies in negotiating social, political, and economic processes, often doing so in ways that rely upon the differential influence and authority that is granted to particular forms of knowledge or representations" (Elwood, 2010, p. 352). In other words, the knowledge politics research looks at the social and spatial processes that have led to some epistemologies being included in spatial technology praxis. The exploration of this praxis is perhaps one of the most exciting humanitarian aid evolutions that warrant new research.

Additionally, the persistence of the digital humanitarian phenomenon at the local level of disasters warrants additional research. It still represents an ongoing evolution of the collaborative processes between empowered public networks of action and traditional institutions of the mandate. Considering the present pervasiveness of ICTs in everyday life in the wake of the global COVID-19 pandemic, it is logical to surmise that digital communication and collaboration will become more persistent. Therefore, the study of how societies develop online relationships with their mandated agencies and engage in digital humanitarianism is perhaps more applicable now than it has ever been.

6.3. ADDRESSING THE RESEARCH QUESTIONS

Research Question #1: How do HROs and V&TCs structure their collaborations?

The HROs and V&TCs structured their collaborations by incentivizing both sides into both online and offline dialogues. These had to be facilitated by UNOCHA and DHN coordinators who engaged in enrolling individual members from their respective networks into informal meetings. This study's CGM remarks indicate that the HROs and V&TCs began their collaborations with no formal process of ensuring stability or success. Instead, much responsibility was placed on the *Facilitative Leaders* (the UNOCHA/DHN coordinators) to secure the participation of the HROs and V&TCs by synthetically inducing trust via *social brokerage* and *boundary spanning* until genuine trust could be established in offline settings. As this occurred, the Institutional Design structure of their collaborations began to take shape before they were abandoned due to partnership fatigue and the strategic shift by the HROs. Had the HROs and V&TCs been allowed to complete the structuring, it is possible the two networks would have had a much more significant impact on the humanitarian aid sector, and the notion of digital humanitarianism would still be a persistent concept among both professional humanitarians and digital volunteers.

Research Question #2: What are the underlying challenges for HROs and V&TCs to collaborate?

The underlying challenges facing the HROs and V&TCs were significant differences regarding the utility of big data and crowdsourcing in the humanitarian aid sector's sensemaking processes. Fundamentally, HROs and V&TCs had very different visions and agendas concerning the future of humanitarianism and the role of ICTs. The collaborations' messiness and limited management capacity made them prone to a lack of cooperation due to unpreparedness. The HROs' limited bandwidth for collaboration and indulging in new sensemaking methods ultimately meant that the notion of big data as a potential new source of information remained on the periphery of the HROs. Similarly, the V&TCs lack of representation in humanitarian

deployments and inability to articulate their added value HROs hamstrung them from achieving their full potential. In essence, unpreparedness, lack of articulation/translation of needs and risks, the non-committal nature of the collaborations, and most essentially, the lack of time to address these issues ensured that HROs and V&TCs fell into partnership fatigue and disengaged.

Research Question #3: How does governance form out of the collaborations of the HROs and V&TCs?

The practice of enrolling members from the HROs and V&TCs into the collaborations was an essential part of shaping governance in the case. The *Institutional Design* and *Starting Conditions* of the collaborations were non-inclusive and offered little mutual interdependence. Therefore, *Commitment to the Collaborative Process* had to be cultivated by first generating *Shared Understanding* between the actors. The CGM adaptation showed how actors could influence the *Institutional Design* and *Starting Conditions* of the *Collaborative Process* and engage a feedback process that reshaped the model from an input-output design to a cyclical one. This is made possible via the strong leadership of facilitators (the UNOCHA/DHN coordinators) by engaging in a trust-building two-phase process. First, swift trust is utilized to enroll actors into a mutual digital forum. Second, actors are engaged in a managed comingling in offline settings to develop genuine trust through *Face-to-Face Dialogue*. As this occurs, articulation of the actors' needs and risks takes shape, potentially improving the *Intermediate Outcomes* (e.g., guidance documents and feedback reports) and the *Collaborative Outcome* (e.g., a crisis map or protocol for engagement). These feed into the *Institutional Design* and *Starting Conditions*, which make up the framework for governance onto which the *Collaborative Process* will form for future engagements.

6.4. SUMMARY

The chapter provided a discussion following the case study's findings and drawing on the theoretical approach: The Collaborative Governance Model. The model helped make sense of the causes of the failures between the HROs and V&TCs, but it was not optimal for some study parts. For instance, it did not offer guidance for understanding how Collaborative Governance can be established in non-linear ways. However, the findings showed that actors were in the process of generating a viable structure for their collaborations before they were abandoned due to partnership fatigue, strategic shifts for unilateral action, and time sensitivity.

Also, the departure of key individuals from the coordination network nearly ended the comingling of the HRO/V&TCs' networks. Nonetheless, the study did offer some significant insights. It showed that actors can be inducted into dialogue and

that their coming together can produce governance forms through articulation work and feedback. Through feedback, the input-output model of Collaborative Governance reshapes into a cyclical form, informing the larger framework upon which the collaborations will align to produce meaningful results.

The chapter also provided insight into the literature's contribution to big data usability, crowdsourcing, digital humanitarianism in humanitarian aid, and Collaborative Governance in crisis management. The findings show that a significant part of the collaborative failures had to do with skepticism about the potential of big data in humanitarian aid. In the context of digital humanitarianism, big data has raised important questions concerning its management, which affect the decision making of those involved in the provision of aid, especially in contexts and relationships characterized by inequality and power. The emergence of crowdsourced crisis mapping in an era of digital connectivity does not take away fundamental human instincts for interaction, and professional humanitarians continue to struggle to build online working relationships, relying instead on offline connections.

Despite the admirable efforts of the UNOCHA and the DHN to connect V&TCs to HROs and bridge the technical and humanitarian divide, there is little evidence of their success. As a result, the humanitarian aid sector struggles with the notion of big data as a potential resource for adding insights directly from their beneficiaries, especially in the past several years when donor support and funding have declined. If the HROs wish to maintain their relevancy in humanitarian aid, they need to improve their transparency and research into collaborative failure.

On the notion of digital humanitarianism, it is no longer as prominent to research as it was in 2015, but some researchers still find its continuation interesting. Considering the present pervasiveness of ICTs in everyday life in the wake of the global COVID-19 pandemic, it is logical to surmise that digital communication and collaboration will become more persistent. Therefore, the study of how societies develop online relationships with their mandated agencies and engage in digital humanitarianism is perhaps more applicable now than it has ever been, warranting new research into its current state of the art.

7

CONCLUSION

7.1. INTRODUCTION

The chapter offers concluding remarks regarding the theoretical contribution and the novelty of the research. The chapter is divided into six sections dealing with the contributions of the study. These include the practical implications of the study's findings and the implications for Collaborative Governance research, its practical implications, the limitations for such research, and the suggestions for future research.

7.2. THEORETICAL CONTRIBUTION AND NOVELTY

The research highlighted the barriers to collaboration across the humanitarian and digital spheres.

The approach to studying this phenomenon differed from previous research on Collaborative Governance in that this manuscript focuses on a case of collaborative failure. The study distinguished the mechanisms that describe how inclusivity, or lack thereof, can impact collaborative outputs' environmental standards. Concerns over secure data sharing, collaboration within stressful emergency contexts, a fear of unsettling established bureaucratic procedures, personal reservations around new technologies, and a lack of preparedness are just some of the issues that prevented the maximum utilization of the V&TCs.

While there have been efforts made to address preparedness (see Whipkey and Verity, 2015; Hunt and Sprecht, 2016; Siemen, 2017), there remains a dramatic contrast between the hierarchical organizational structures of the HROs and the decentralized structures of the V&TCs, creating significant obstacles to effective communication, coordination and collaboration. For instance, the study found HROs and V&TCs struggled to represent environmental concerns, such as the UN Cluster System's bureaucracy and the information needs of organizations in the field, and their inability to engage in dialogical interaction inclusively. What follows is a summary of the research questions and their contribution to the theoretical perspective of Collaborative Governance:

Research Question #1: How do HROs and V&TCs structure their collaborations?

The HROs and V&TCs structured their collaborations through *Facilitative Leadership* by incentivizing both sides into online and offline dialogues. As this occurred, the *Institutional Design* structure of their collaborations began to change after a feedback process took shape that the UNOCHA/DHN coordinators managed. The changes concerned calls for reform to align both sides to one another better but were unsuccessful. Unfortunately, the effort to facilitate an informal merger

between the HRO and V&TC networks was too slow to avert partnership fatigue, as the feedback process had been introduced too late. However, their attempts showed that Collaborative Governance is not merely a linear theory for achieving *Collaborative Outcomes*, but that actors will circumvent restrictive *Institutional Designs* and *Starting Positions*. Collaborative networks will inevitably reorder and restructure their networks to match their needs through new relationship pathways and inform the creation of a new protocol or framework that reflects the new environment, potentially changing the focus of agendas and policies.

Research Question #2: What are the underlying challenges for HROs and V&TCs to collaborate?

The underlying challenges facing the HROs and V&TCs speak to the practical implications of the research. There were significant differences regarding the levels of engagement among them and general unpreparedness to collaborate. These can be explained in five key challenges:

1. The lack of access to resources and staffing to facilitate the management of collaboration. While the limited availability of resources was a factor favoring collaboration, they did not possess even the limited availability of resources to sustain the collaborations beyond one-off interactions. Such limitations affected the willingness to collaborate.
2. Low commitments among both HROs and V&TCs to bear responsibility for the *Collaborative Process*. On the one hand, the HROs had limited bandwidth for interest in the V&TCs' activities; on the other hand, the V&TCs had difficulty getting their digital volunteers to commit to long-term collaborations professional humanitarians. This led to instances where V&TCs did not have enough available volunteers for crowdsourcing activities and further led to active volunteers' burnout due to heavy workloads.
3. A third challenge concerned the HROs' need for commitment and conformity to the UN Cluster System (Harvard Humanitarian Initiative, 2011). In establishing relationships with V&TCs, HROs need to know what to expect, e.g., how long they will be around, a longer-term effort worth investing in, et cetera. This was not always clear.
4. The different levels of engagement among the HROs and V&TCs. On the one hand, HROs tended to have a broader view of the field's operational needs, including on-the-ground logistical challenges and budgetary constraints. On the other hand, V&TCs focused on testing their innovations and enabling citizens to help each other. Due to these differences, the priorities between them shifted in favor of disengagement.
5. Different ways of working between HROs and V&TCs. On the one hand, HROs worked in hierarchies; on the other hand, the V&TCs had decentralized

structures where accountability was less guaranteed. As a result, V&TCs tended to move faster regarding producing information products, while the HROs relied on their traditional protocols and partnerships in the field. However, that reliance also meant reduced bandwidth and applicability of the V&TCs' contributions, culminating in partnership fatigue.

Interestingly, these same challenges were identified by Van Gorp (2014), who warned of the need to integrate the networks in offline forums. It is unfortunate that despite the knowledge of these failures, the challenges remained unresolved. Overall, the resource constraints were a significant impediment to quick technology adaptation. Large HROs, including UNOCHA, the Red Cross, and the World Bank, tend to agree on the promise of ICTs, hence the need to use them better (e.g., Steets et al., 2012). However, it is unknown what steps the HROs have taken to adopt ICTs further into their sensemaking toolboxes since they scaled-down their activities with the V&TCs. Neither is it known which V&TCs survived the dissolution of the DHN in 2019 or what they may be doing presently. Considering the importance of the humanitarian aid sector and the lack of new information regarding the HROs' technological development, new research is recommended to study how both HROs and V&TCs have fared and whether the object of their collaborations should be revisited.

Research Question #3: How does governance form out of the collaborations of the HROs and V&TCs?

The practice of enrolling members from the HROs and V&TCs into the collaborations was an essential part of shaping governance in the case. The *Institutional Design* and *Starting Conditions* of the collaborations were non-inclusive and offered little mutual interdependence. This was made possible via the strong leadership of facilitators (the UNOCHA/DHN coordinators) by engaging in a trust-building two-phase process. First, swift trust is utilized to enroll actors into a mutual digital forum. Second, actors are engaged in a managed comingling in offline settings to develop genuine trust through *Face-to-Face Dialogue*. As this occurs, articulation of the actors' needs and risks takes shape, potentially improving the *Intermediate Outcomes* (e.g., guidance documents and feedback reports) and the *Collaborative Outcome* (e.g., a crisis map or protocol for engagement). These feed into the *Institutional Design* and *Starting Conditions*, which make up the framework for governance onto which the *Collaborative Process* will form for future engagements.

The study also illustrated the linking of independent with dependent variables that may lead to better (or worse) *Collaborative Outcomes*. These were represented in the adaptation of Ansell and Gash's (2008) Collaborative Governance Model (see Figure 20). The independent variables, *Institutional Design* and *Starting Conditions*

were ultimately not conducive to the *Collaborative Process*, leading it to failure. However, interestingly, those same variables began to reshape through a feedback process created by the *Facilitative Leadership*, thereby maligning the original input/output design of the CGM to a cyclical design. This happened when the focus of the collaborations started to include management goals for the *Collaborative Outcomes*. By linking network structure to collaborative dynamics, the study in this manuscript helps elaborate potential non-linear structuring mechanisms of Collaborative Governance. Further research can be applied to study digitalized networks' collaborative dynamics and the sociological and policy outcomes to complex public issues.

7.3. PRACTICAL IMPLICATIONS

On the one hand, knowledge among the HROs of the potential benefit of ICTs has changed the nature of information products and humanitarian aid services. However, as the manuscript has highlighted, there is a significant incompatibility between the UN Cluster System's existing bureaucracy and the more democratic methods used by the V&TCs, such as crowdsourcing, crisis mapping, data aggregation, software development, and other ICT based services (Van Gorp, 2014). That is because the HROs lacked theories that would take an adaptation perspective to traditional disaster sensemaking and have neglected the costs of establishing and maintaining new relationships to leverage ICTs broadly. With this in mind, new research is warranted that includes studies on the evolution of trust and social brokerage in developing comingling digital networks (Silvia, 2018; Grønnegård, 2018), and changing public administration. (Ansell, Sørensen and Torfing, J. (2020). This is especially timely considering the ongoing COVID-19 pandemic when digital communication and sensemaking is now the status quo.

Trust and commitments are arguably two of the most cited factors affecting inter-organizational coordination and organizations' willingness to establish collaborative relationships (Van Gorp, 2014). Additionally, even though HROs have made some steps forward over the years in terms of information sharing through ICTs in general, creating a culture where actors in humanitarian deployments share information and build trust and commitment is still a significant challenge.

The challenges of addressing trust and commitment have much influence from the humanitarian aid sector's design itself. Since humanitarian aid depends on a range of motivations driven by organizational and donor pressures, its sector is interpreted as a cultural and spatial phenomenon that is best observed through an ethnographic study of different actors' practices and the dynamics of aid delivery (Collins et al., 2013). For instance, how humanitarian workers define and organize their work is influenced by their agency's mission and understanding of

the context and assessment of the disaster's scope (Jackson, 2012). These can include pressures by donors to present the context of a disaster in a particular way, as the political context of a crisis also has a strong bearing on the cooperation between governments, HROs, and V&TCs, and can significantly impact the process of data verification from dependable records (Duffield, 2010; Hunt and Sprecht, 2016). Therefore, the study of the relationship between said pressures and disaster sensemaking is an area that warrants examination as the humanitarian aid sector grows.

The challenge of standardizing collective humanitarian action is establishing leadership around which humanitarian aid contributors can be coordinated, as there is no mechanism to compel organizations to cooperate. Consequently, 'humanitarian deployments' are associated with the decentralized mobilization of hundreds of NGOs, non-profits, donors, and philanthropic entities that the UN Cluster System struggles to govern (Wood and Frazier, 2019). Over the past decade, the debate has arisen over the relative roles of the HROs, as some of the larger ones like UNOCHA, World Bank, World Food Programme, and Save the Children Foundation do possess the resources to improve disaster sensemaking with ICTs, but lack the bandwidth or organizational support to do so.

Simultaneously, the other HROs are preoccupied with ensuring their survival as legitimate entities and likely still use the same outdated methods of collecting information from a limited number of official sources (Shahi, 2013). Therefore, it is quite likely that the HROs and the humanitarian aid sector in general still struggle to adopt modern methods of disaster sensemaking invented by the V&TCs, especially those that utilized big data such as crisis mapping, SMS surveys, and crowdsourcing.

The UN's "Agenda for Humanity" put forward an aid localization agenda that included a commitment to empowering local NGOs with the capacity to deliver aid more effectively ("World Humanitarian Summit," 2016). While this vision is noble, it is important to track how the aid localization is operationalized and applied. Considering that the HROs sought to seek digital capacities unilaterally, new research is suggested to focus on whether that was the case and evaluate those organizations' information management performances. This study highlighted the UN Cluster System's *Institutional Design* and how it affected the collaborations between the HROs and V&TCs. Consequently, the impact around adopting ICTs in the humanitarian aid sector and the broadening of disaster sensemaking warrants additional research.

On the other hand, despite the dissolution of the DHN, digital humanitarianism remains a topic for research among some scholars (See Chernobrov, 2018; Burns, 2019; Norris, 2020). In fact, in the time of COVID-19, it is perhaps more applicable

than ever. Despite the growing need for digital humanitarianism, there is still limited know-how about leveraging such technological concepts into crisis management (Kumar, Vishwakarma, and Upadhyay, 2020). For instance, digital health is still in its adolescence, but the sector is developing rapidly in the wake of the COVID-19 pandemic (Fernandez-Luque and Imran, 2018). For example, India's government has leveraged the use of NGOs and civil society workers during the outbreak of COVID-19 to track communities that are most at risk. Therefore, the dynamic capability to leverage digital humanitarianism is vital for organizations as the pandemic continues (Kumar, Vishwakarma, and Upadhyay, 2020).

Additionally, the digital humanitarian phenomenon now resides around project-based aid work, which entails the temporary employment of aid-beneficiaries themselves to take the role formerly held by the V&TCs (Ong and Cobinido, 2018). While digital work enables upward mobility, it is also responsible for a broader shift toward casual outsourced work. If contextual research was invested in areas more susceptible to natural disasters and in which there is a substantial communications infrastructure, it could prove beneficial to invest more in the upskilling of local communities with digital skills or establishing local digital humanitarian hubs (Hunt and Sprecht, 2016). Significantly as technology to predict natural disasters improves, local and international V&TCs should be involved in pre-disaster planning.

7.4. IMPLICATIONS FOR THE RESEARCH: COLLABORATIVE GOVERNANCE IN PUBLIC/PRIVATE PARTNERSHIPS

The attempts at Collaborative Governance between HROs and V&TCs also reflect work in Public/Private Partnerships. For instance, a small number of collaborating individuals often establish Public/Private Partnerships but extend at later development stages requiring a seamless and transparent partner selection procedure (Meissner, 2019). Moreover, in globalization, the regulatory requirements for public/private partnerships in countries and regions are becoming increasingly important (Scott, Thomas, and Magallanes, 2019). In particular, technology-based innovation seems to be more effective than other kinds of innovation in addressing citizens' specific needs when engaging specific kinds of users and developing them in collaboration within Public/Private Partnerships. From this perspective, research can cover new ideas (products, services, and models) that simultaneously meet socially recognized needs and create new collaborations that are both good for society and enhance society's capacity to act (Battisti, 2019). As Betts and colleagues (2014) stated, "a means of adaptation and improvement through scaled solutions to problems, in the form of products, processes or wider business models... can be applied to nearly any specialized area, and may include technology but not be reducible to it" (, p.5).

Developing innovative projects towards achieving the socio-economic impact of technology is a challenge for researchers, industry, and policymakers. The current mainstream of open innovation (e.g., Chesbrough and Di Minin, 2014) lacks a new organizational model for the development of innovation that addresses social and business needs (Battisti, 219). Thus, Seebode, Jeanrenaud, and Bessant (2012) argued that to cope, organizations must embrace massive changes within the innovation process, leading to high impact creation in terms of business and social aspects. Thus, new models must be designed to cope with inclusivity in traditional Public/Private Partnerships when collaborations are unsuccessful in introducing systemic changes.

In consideration of a new approach to the development of technology-enabled social innovation, our study contributed by showing that actors can adapt their *Power and Knowledge Asymmetries* in phased intervals of synthetic trust brokerage, genuine *Trust Building*, and steady reformatting of their environmental conditions, including regulatory measures that prove to be obstructive. In this way, the variables of Collaborative Governance and Public/Private Partnerships can be compared and even mixed to arrive at a new conceptualization of both. Public/private partnerships imply the purposeful application of Collaborative Governance. The latter removes the assumption that all partners are equal and that decision-making processes are collaborative and consensus-oriented (Jensen, 2019).

7.5. LIMITATIONS OF THE RESEARCH

The research's limitations concern the data utilized to test Collaborative Governance as a viable theory via survey instruments or subjective responses from individuals. The qualitative nature of the research, although complimentary, would have been better served with a statistical method of evaluating disaster sensemaking in humanitarian aid. Instead, the study covered a micro-level examination of a macro-problem under particular conditions and contexts. The interview responses offer only a part of the whole picture of why the collaborations between the HROs and V&TCs failed. Additionally, research should be invested in the planning or pre-operational phase of humanitarian deployments concerning the dynamic environment in which actors must overcome coordination and integration challenges. Future studies should employ a mixed-methods approach that utilizes a metric or key-performance-indicator for information management in humanitarian settings or some form of scoring that informs the structured design of Collaborative Governance in disaster sensemaking.

7.6. SUGGESTIONS FOR FUTURE RESEARCH

While this study has focused on Collaborative Governance, several of the mechanisms described here are likely to have more general relevance to other sectors, such as public health, spatial planning, and public administration. There is significant potential for the Collaborative Governance Model (CGM) to structure and guide empirical research on Collaborative Governance's effectiveness in Public/Private Partnerships that are mediated digitally. However, new research is needed to focus on the original CGM adaption to that accounts for how digital networks dynamically work.

The adaptation of Ansell and Gash's CGM in the Discussion Chapter supports the supposition that Collaborative Governance leads to better performance outcomes when the collaborating actors identify the mechanisms that mitigate their risks and establish trust. As the study showed, this through member enrollments to a shared network; however, it needs to account for digitalized or alternative Trust-Building methods where actors develop a shared understanding of their mutual problem via deliberation and negotiation.

Accompanying Collaborative Governance's proliferation are calls to evaluate its performance better (Emerson and Nabatchi 2015; Pereira et al., 2018; Ansell and Gash, 2019). Collaborative Governance's outcomes are theorized to emerge from interpersonal and inter-organizational dynamics like principled engagement amongst participants (Emerson and Nabatchi 2015). Therefore, it is recommended that research be invested into adapting the Collaborative Governance Model by linking the variables to highly dynamic digital networks' network structures.

As aforementioned, Public/Private Partnerships are a fascinating area of study for this, as public administrations localize and become more decentralized with the ubiquity of social media and civic engagement technologies (Meissner, 2019). The collaborative dynamics of digital networks in Public/Private Partnership models can offer insight into new mechanisms for structuring the Collaborative Governance Model in contemporary settings. These would further explore the implications of key network assumptions, test different collaborative commitment, and trust strategies, and model the emergent properties that result from inter-actor deliberation in the digital age. In this way, researchers can examine potential Collaborative Governance outputs under different design choices and network contexts.



BIBLIOGRAPHY

APPENDIX I

INTERVIEW PROTOCOL AND GUIDELINES

APPENDIX II

ANALYSIS AND CODING GUIDELINES

APPENDIX III

CONSENT AND CONFIDENTIALITY AGREEMENT

RÉSUMÉ

BIBLIOGRAPHY

- World Health Organization, (n.d.). "About WHO" Retrieved December 29, 2020, from <https://www.who.int/about>
- Adam, N., Shafiq, B., and Staffin, R. (2012). Spatial computing and social media in the context of disaster management. *Intelligent Systems, IEEE*, 27(6), 90–96.
- Agar, M. H. (1996). *The professional stranger: An informal introduction to ethnography* (Vol. 2). San Diego, CA: Academic Press.
- Agranoff, R., & McGuire, M. (1998). Multinetwork management: Collaboration and the hollow state in local economic policy. *Journal of Public Administration Research and Theory*, 8(1), 67-91.
- Alexander, J. A., Comfort, M. E., & Weiner, B. J. (1998). Governance in Public-Private Community Health Partnerships: A Survey of the Community Care Network SM Demonstration Sites. *Nonprofit management and leadership*, 8(4), 311-332.
- Aly, H. (2019, April 16). Q&A: 'UN doesn't have to change,' says relief chief. Retrieved February 12, 2017, from <https://www.thenewhumanitarian.org/report/102119/qa-%E2%80%98un-doesn%E2%80%99t-have-change%E2%80%99-says-relief-chief>
- Altay, N., & Green, W. G. (2006). OR/MS research in disaster operations management. *European journal of operational research*, 175(1), 475-493.
- Altay, N., & Labonte, M. (2014). Challenges in humanitarian information management and exchange: evidence from Haiti. *Disasters*, 38(s1), S50-S72.
- Amin, S., & Goldstein, M. P. (Eds.). (2008). *Data against natural disasters: establishing effective systems for relief, recovery, and reconstruction*. World Bank Publications.
- Amoore, L. (2009). Algorithmic war: Everyday geographies of the war on terror. *Antipode*, 41(1), 49-69.
- Andranovich, G. (1995). Achieving consensus in public decision making: Applying interest-based problem solving to the challenges of intergovernmental collaboration. *The Journal of applied behavioral science*, 31(4), 429-445.
- Andrews, C. J. (2002). *Humble analysis: the practice of Joint Fact-Finding*. Greenwood Publishing Group.
- Ansell, C., & Gash, A. (2008). Collaborative governance in theory and practice. *Journal of public administration research and theory*, 18(4), 543-571.
- Ansell, C., & Gash, A. (2018). Collaborative platforms as a governance strategy. *Journal of Public Administration Research and Theory*, 28(1), 16-32.
- Ansell, C., Doberstein, C., Henderson, H., Siddiki, S., & 't Hart, P. (2020). Understanding inclusion in collaborative governance: a mixed methods approach. *Policy and Society*, 39(4), 570-591.
- Ansell, C., Sørensen, E., & Torfing, J. (2020). The COVID-19 pandemic as a game changer for public administration and leadership? The need for robust governance responses to turbulent problems. *Public Management Review*, 1-12.
- A/RES/46/182: Strengthening of the coordination of humanitarian affairs. (1991, December 19). United Nations General Assembly. Retrieved November 10, 2013, from <http://www.un.org/documents/ga/res/46/a46r182.htm>.
- Baack, S. (2015). Datafication and empowerment: How the open data movement re-articulates notions of democracy, participation, and journalism. *Big Data & Society*, 2(2), 2053951715594634.
- Baird, T. (2017). Knowledge of practice: A multi-sited event ethnography of border security fairs in Europe and North America. *Security Dialogue*, 48(3), 187-205.

- Baker, J. (2014). Humanitarian capacity-building and collaboration: lessons from the Emergency Capacity Building Project. Retrieved January 15, 2018, from <https://odihpn.org/resources/humanitarian-capacity-building-and-collaboration-lessons-from-the-emergency-capacity-building-project/>.
- Balcik, B., Beamon, B. M., Krejci, C. C., Muramatsu, K. M., & Ramirez, M. (2010). Coordination in humanitarian relief chains: Practices, challenges, Schutt and opportunities. *International Journal of Production Economics*, 126(1), 22-34.
- Baldaccini, A., 2010. Extraterritorial border controls in the EU: the role of FRONTEX in operations at sea. In: B. Ryan and V. Mitsilegas, eds. *Extraterritorial immigration control: legal challenges*. Leiden: Martinus Nijhoff.
- Barnes, T. J. "Big Data, Little History." *Commentary: Dialogues in Human Geography* 3, no. 3 (2013): 297– 302. <http://dhg.sagepub.com/cgi/content/abstract/3/3/297>
- Barnett, M. N. (2013). Humanitarian governance. *Annual Review of Political Science*, 16, 379-398.
- Barnett, M., & Stein, J. G. (2012). *Sacred aid: Faith and humanitarianism*. Oxford University Press.
- Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The qualitative report*, 13(4), 544-559.
- Beamon, B. M., & Kotleba, S. A. (2006). Inventory modelling for complex emergencies in humanitarian relief operations. *International Journal of Logistics: research and applications*, 9(1), 1-18.
- Bednarek, A. T., Wyborn, C., Cvitanovic, C., Meyer, R., Colvin, R. M., Addison, P. F. E., ... & Leith, P. (2018). Boundary spanning at the science-policy interface: the practitioners' perspectives. *Sustainability Science*, 13(4), 1175-1183.
- Beierle, T. C., & Konisky, D. M. (2001). What are we gaining from stakeholder involvement? Observations from environmental planning in the Great Lakes. *Environment and Planning C: Government and Policy*, 19(4), 515-527.
- Belotto, M. J. (2018). Data analysis methods for qualitative research: Managing the challenges of coding, interrater reliability, and thematic analysis. *The Qualitative Report*, 23(11), 2622-2633. Retrieved from <https://nsuworks.nova.edu/tqr/vol23/iss11/2>
- Bentrup, G. (2001). Evaluation of a collaborative model: a case study analysis of watershed planning in the Intermountain West. *Environmental management*, 27(5), 739-748.
- Besiou, M., & Van Wassenhove, L. N. (2020). Humanitarian operations: A world of opportunity for relevant and impactful research. *Manufacturing & Service Operations Management*, 22(1), 135-145.
- Bessant, J., Rush, H., & Trifilova, A. (2015). Crisis-driven innovation: The case of humanitarian innovation. *International journal of innovation management*, 19(06), 1540014.
- Betts, A., Bloom, L., Kaplan, J. D., & Omata, N. (2014). Refugee economies: Rethinking popular assumptions (pp. 1-44). University of Oxford, Refugee Studies Centre.
- Bingham, L. B., Nabatchi, T., & O'leary, R. (2005). The new governance: Practices and processes for stakeholder and citizen participation in the work of government. *Public administration review*, 65(5), 547-558.
- Bishr, M. and Janowicz, K. (2010). Can we Trust Information? - The Case of Volunteered Geographic Information. In Workshop at Future Internet Symposium Towards Digital Earth: Search, Discover and Share Geospatial Data.
- Blank, G., & Reisdorf, B. C. (2012). The participatory web: A user perspective on Web 2.0. *Information, Communication & Society*, 15(4), 537-554.

- Blatner, K. A., Carroll, M. S., Daniels, S. E., & Walker, G. B. (2001). Evaluating the application of collaborative learning to the Wenatchee fire recovery planning effort. *Environmental Impact Assessment Review*, 21(3), 241-270.
- Bloom, L., & Faulkner, R. (2015). Innovation spaces.
- Boin, A., & Kuipers, S. (2018). The crisis approaches. In *Handbook of Disaster Research* (pp. 23-38). Springer, Cham.
- Boin, A., & Bynander, F. (2015). Explaining success and failure in crisis coordination. *Geografiska Annaler: Series A, Physical Geography*, 97(1), 123-135.
- Boin, A., & Kuipers, S. (2018). The crisis approaches. In *Handbook of disaster research* (pp. 23-38). Springer, Cham.
- Booher, D. E. (2004). Collaborative governance practices and democracy. *National Civic Review*, 93(4), 32-46.
- Borgatti, S. P. (2006). Identifying sets of key players in a social network. *Computational & Mathematical Organization Theory*, 12(1), 21-34.
- Bradley, Q. (2012). A 'performative' social movement: The emergence of collective contentions within collaborative governance. *Space and Polity*, 16(2), 215-232.
- Bradley, M. (2017). The International Organization for Migration (IOM): gaining power in the forced migration regime. *Refuge: Canada's Journal on Refugees*, 33(1), 97-106.
- Bradol J.H. (2004). The sacrificial international order and its goals and principles. In the Shadow of "Just Wars": Violence, Politics, and Humanitarian Action, ed. F Weissman, 1:1-22. Ithaca, NY: Cornell Univ. Press
- Bradford, N. (1998). Prospects for associative governance: Lessons from Ontario, Canada. *Politics & Society*, 26(4), 539-573.
- Brändström, A., & Kuipers, S. (2003). From 'normal incidents' to political crises: Understanding the selective politicization of policy failures. *Government and Opposition*, 38(3), 279-305.
- Brauman, R. (1996). Le dilemme humanitaire. Entretien avec Philippe Petit. Paris: Les Éditions Textuel, 106 pp.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2), 77-101.
- Brinkerhoff, J. (2009). *Digital Diasporas: Identity and Transnational Politics*. New York: Cambridge Univ. Press
- Bingham, L. B., O'Leary, R., & Carlson, C. (2008). Frameshifting: Lateral thinking for collaborative public management. *Big ideas in collaborative public management*, 3-16.
- Bittner, E. A. C., & Leimeister, J. M. (2013, January). Why shared understanding matters-- Engineering a collaboration process for shared understanding to improve collaboration effectiveness in heterogeneous teams. In *2013 46th Hawaii International Conference on System Sciences* (pp. 106-114). IEEE.
- Brown, A. J. (2002). Collaborative governance versus constitutional politics: decision rules for sustainability from Australia's South East Queensland forest agreement. *Environmental Science & Policy*, 5(1), 19-32.
- Bryson, J. M., Crosby, B. C., & Stone, M. M. (2015). Designing and implementing cross-sector collaborations: Needed and challenging. *Public administration review*, 75(5), 647-663.
- Blomqvist, K., Hurmelinna, P., & Seppänen, R. (2005). Playing the collaboration game right—balancing trust and contracting. *Technovation*, 25(5), 497-504.
- Blomqvist, K., & Ståhle, P. (2000, September). Building organizational trust. In *16th Annual IMP Conference*, Bath, UK (pp. 7-9).

- Brugh, W., Sorokin, G., & Bar-Yam, Y. (2013) Combining Distributed and Centralized Systems in Disaster Response.
- Bruner, J. (1991). The narrative construction of reality. *Critical inquiry*, 18(1), 1-21.
- Bryson, J. M., Crosby, B. C., & Stone, M. M. (2006). The design and implementation of Cross-Sector collaborations: Propositions from the literature. *Public administration review*, 66, 44-55.
- Buchanan-Smith, M. (2003). How the Sphere Project came into being: a case study of policy-making in the humanitarian aid sector and the relative influence of research (pp. 14-6). London: Overseas Development Institute.
- Bulkeley, H. (2005). Reconfiguring environmental governance: Towards a politics of scales and networks. *Political geography*, 24(8), 875-902.
- Burger, J., Gochfeld, M., Powers, C.W., Waishwell, L., Warren, C., & Goldstein, B.D. (2001). Science, policy, stakeholders, and fish consumption advisories: Developing a fish fact sheet for Savannah River. *Environmental Management* 27: 501-14.
- Burns, R. (2014). Moments of Closure in the Knowledge Politics of Digital Humanitarianism. *Geoforum* 53, 51-62.
- Burns, R. (2013). Rethinking Big Data in Digital Humanitarianism: Practices, Epistemologies, and Social Relations. *GeoJournal*.
- Burns, R. (2019). New Frontiers of Philanthro-capitalism: Digital Technologies and Humanitarianism. *Antipode*, 51(4), 1101-1122.
- Burt, R. S. (2001). Closure as social capital. *Social capital: Theory and research*, 31-55.
- Campbell, J. L., Quincy, C., Osserman, J., & Pedersen, O. K. (2013). Coding in-depth semistructured interviews: Problems of unitization and intercoder reliability and agreement. *Sociological Methods & Research*, 42(3), 294-320. doi: 10.1177/0049124113500475
- Capelo, L., Chang, N., & Verity, A. (2012). Guidance for collaborating with volunteer & technical communities. *Digital Humanitarian Network*.
- Carrera, S., 2007. The EU border management strategy: FRONTEX and the challenges of irregular immigration in the Canary Islands. CEPS Working Document 261. Brussels: Centre for European Policy Studies.
- Casper BJ and B Winthereik, BR, 2013. Monitoring Movements in Development Aid: Recursive Partnerships and Infrastructures. MIT Press, Cambridge, MA.
- Castillo, C. (2016). Big crisis data: social media in disasters and time-critical situations. Cambridge University Press.
- Clarke, P., & Ramalingam, B. (2008). Organisational change in the humanitarian sector. London: ALNAP/Overseas Development Institute.
- Comfort, L.K. (2007), "Crisis management in hindsight: Cognition, communication, coordination, and control", *Public Administration Review*, Vol. 67 No. SUPPL. 1, pp. 189- 197.
- Comes, T., Vybornova, O., & Van de Walle, B. (2015, March). Bringing Structure to the Disaster Data Typhoon: An Analysis of Decision-Makers' Information Needs in the Response to Haiyan. In *AAAI Spring Symposia*.
- Coombs, W. T., & Holladay, S. J. (Eds.). (2011). *The handbook of crisis communication* (Vol. 22). John Wiley & Sons.
- Cooper, T. L., Bryer, T. A., & Meek, J. W. (2006). Citizen-centered collaborative public management. *Public administration review*, 66, 76-88.
- Collinson, S., Duffield, M., Berger, C., Felix Da Costa, D., & Sandstrom, K. (2013). Paradoxes of presence: risk management and aid culture in challenging environments.
- Corbin, J., & Strauss, A. (2008). Qualitative research. Techniques and Procedures for.

- Coyle, D., & Meier, P. (2009). New technologies in emergencies and conflicts: The role of information and social networks. In *New Technologies in Emergencies and Conflicts: The Role of Information and Social Networks*. United Nations Foundation; Vodafone Foundation.
- Chamales, G. (2013). Towards trustworthy social media and crowdsourcing. *Policy memo series*, 2, 12.
- Chandler, D. (2015). A world without causation: Big data and the coming of age of posthumanism. *Millennium*, 43(3), 833-851.
- Chen, R., R. Sharman, H. R. Rao, S. J. Upadhyaya. 2008. Coordination in emergency response management. *Commun. ACM* 51 (5): 66–73.
- Chernobrov, D. (2018). Digital volunteer networks and humanitarian crisis reporting. *Digital Journalism*, 6(7), 928-944.
- Clandinin, D. J., & Connelly, F. M. (2000). *Narrative inquiry*.
- Chrislip, D. D., & Larson, C. E. (1994). Collaborative leadership: How citizens and civic leaders can make a difference (Vol. 24). Jossey-Bass Inc Pub.
- Chua, S., & Westlund, O. (2019). Audience-centric engagement, collaboration culture and platform counterbalancing: A longitudinal study of ongoing sensemaking of emerging technologies. *Media and Communication*, 7(1), 153-165.
- Crawford, K., & Finn, M. (2015). The limits of crisis data: analytical and ethical challenges of using social and mobile data to understand disasters. *GeoJournal*, 80(4), 491-502.
- Creswell, J. W. (2013). *Qualitative Inquiry and research design choosing among five approaches* (3rd Ed). Thousand Oaks, CA: Sage Publications.
- Crotty, M. (1998). *The foundations of social research: Meaning and perspective in the research process*. Sage.
- Crowley, J. (2013). Connecting grassroots and government for disaster response. Available at SSRN 2478832.
- Crowley, J., York, D., Soden, R., & Deparday, V. (2014). *Open data for resilience initiative field guide*. World Bank Publications.
- Crum, M., Poist, R., Kovács, G., & Spens, K. M. (2011). Trends and developments in humanitarian logistics—a gap analysis. *International journal of physical distribution & logistics management*.
- Currie, G., & Brown, A. D. (2003). A narratological approach to understanding processes of organizing in a UK hospital. *Human Relations*, 56(5), 563-586.
- Czarniawska, B. (1999). *Writing management: Organization theory as a literary genre*. Oxford University Press on Demand.
- Daniels, S. E., & Walker, G. B. (2001). *Working through environmental conflict: The collaborative learning approach*.
- Dave, A. (2017). Digital humanitarians: How big data is changing the face of humanitarian response.
- DARA (2010) 'Crisis Reports: Haiti'. In *Humanitarian Response Index 2010*. Madrid: DARA. http://daraint.org/wp-content/uploads/2010/12/Haiti-Crisis-Report_HRI-2010.pdf.
- Day, J. C., & Gunton, T. I. (2003). The theory and practice of collaborative planning in resource and environmental management. *Environments*, 31(2), 5.
- Day, J. M., Junglas, I., & Silva, L. (2009). Information flow impediments in disaster relief supply chains. *Journal of the Association for Information Systems*, 10(8), 1.

- De Albuquerque, J. P., Herfort, B., Brenning, A., & Zipf, A. (2015). A geographic approach for combining social media and authoritative data towards identifying useful information for disaster management. *International journal of geographical information science*, 29(4), 667-689.
- De Longueville, B., Annoni, A., Schade, S., Ostlaender, N., and Whitmore, C. (2010). Digital earth's nervous system for crisis events: real-time sensor web enablement of volunteered geographic information. *International Journal of Digital Earth*, 3(3), 242-259.
- De Munck, V. C., & Sobo, E. J. (Eds.). (1998). *Using methods in the field: a practical introduction and casebook*. Rowman Altamira.
- Denison, D. R. (1996). What is the difference between organizational culture and organizational climate? A native's point of view on a decade of paradigm wars. *Academy of management review*, 21(3), 619-654.
- DeSantis, L., & Ugarriza, D. N. (2000). The concept of theme as used in qualitative nursing research. *Western Journal of Nursing Research*, 22(3), 351-372.
- Digital Humanitarian Network. (2019, December 27). Partners. Retrieved December 24, 2020, from <https://www.digitalhumanitarians.com/partners/>
- Digital Humanitarian Network. "DHN activations in 2015 fiscal year". (November 2017). [Accessed 23 December 2017].
- DiMaggio, P. J., & Powell, W. W. (Eds.). (1991). *The new institutionalism in organizational analysis* (Vol. 17). Chicago, IL: University of Chicago Press.
- Downey, G. (2014). Making media work: Time, space, identity, and labor in the analysis of information and communication infrastructures. *Media technologies: Essays on communication, materiality, and society*, 141-66.
- Duffield, M. (2007) *Development, Security and Unending War. Governing the World of Peoples*. Cambridge: Polity Press, 266 pp.
- Dunn, E.C. (2012). The chaos of humanitarian aid: adhocacy in the Republic of Georgia. *Humanity* 3 (1):1-22
- Earney, C., & Jimenez, R. M. (2019). *Pioneering Predictive Analytics for Decision-Making in Forced Displacement. Guide to Mobile Data Analytics in Refugee Scenarios: The'Data for Refugees Challenge' Study*, 101.
- Ehrmann, J. R., & Stinson, B. L. (1999). Joint Fact-Finding and the use of technical experts. *The consensus building handbook*, 375, 377.
- Elwood, S. (2008). Volunteered geographic information: future research directions motivated by critical, participatory, and feminist GIS. *GeoJournal*, 72(3-4), 173-183.
- Elwood, S. (2010). Geographic information science: Emerging research on the societal implications of the geospatial web. *Progress in human geography*, 34(3), 349-357.
- Emerson, R. M., Fretz, R. I., & Shaw, L. L. (2010). Prendre des notes de terrain. *Rendre compte des significations de membres. L'engagement ethnographique*, 129-168.
- Emerson, K., Nabatchi, T., & Balogh, S. (2012). An integrative framework for collaborative governance. *Journal of public administration research and theory*, 22(1), 1-29.
- Emerson, K., & Nabatchi, T. (2015). *Collaborative governance regimes*. Georgetown University Press.
- Endsley, M. R., Farley, T. C., Jones, W. M., Midkiff, A. H., & Hansman, R. J. (1998). *Situation awareness information requirements for commercial airline pilots*. International Center for Air Transportation.
- Fadiya, S. O., Saydam, S., & Zira, V. V. (2014). Advancing big data for humanitarian needs. *Procedia Engineering*, 78, 88-95.

- Fernandez-Luque, L., Imran, M.: Humanitarian health computing using artificial intelligence and social media: a narrative literature review. *Int. J. Med. Inform.* (2018).
- Ferrin, D. L., Dirks, K. T., & Shah, P. P. (2006). Direct and indirect effects of third-party relationships on interpersonal trust. *Journal of applied psychology*, 91(4), 870.
- Fisher, C. W., & Kingma, B. R. (2001). The criticality of data quality as exemplified in two disasters. *Information & Management*, 39(2), 109-116.
- Finn, M., & Oreglia, E. (2016, February). A fundamentally confused document: Situation reports and the work of producing humanitarian information. In *Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing* (pp. 1349-1362).
- Flanagin, A. J. and Metzger, M. J. (2008). The credibility of volunteered geographic information. *GeoJournal*, 72(3-4), 137-148.
- Folke, C., Hahn, T., Olsson, P., Norberg, J., 2005. Adaptive governance of socio-ecological systems. *Annual Review of Environment and Resources* 30, 441-473.
- Fraustino, J. D., Liu, B., & Jin, Y. (2012). Social media use during disasters: a review of the knowledge base and gaps.
- Freeman, J. (1997). Collaborative governance in the administrative state. *UCLA L. Rev.*, 45, 1.
- Friedman, V. J. (2001). Action science: Creating communities of inquiry in communities of practice. In P. Reason & H. Bradbury (Eds.), *Handbook of action research* (pp. 159-170). London: Sage.
- Fung, A., & Wright, E. O. (2001). Deepening democracy: Innovations in empowered participatory governance. *Politics & Society*, 29(1), 5-41.
- Futrell, R. (2003). Technical adversarialism and participatory collaboration in the US chemical weapons disposal program. *Science, Technology, & Human Values*, 28(4), 451-482.
- Edelenbos, J. (2005). Institutional implications of interactive governance: Insights from Dutch practice. *Governance*, 18(1), 111-134.
- Gagnet, M. M. (2017). *The United Nations Cluster Approach to Humanitarian Aid: A Critical Analysis and Reform Proposal Based on Focused Mitigation Efforts*.
- Gamson, W. A., Croteau, D., Hoynes, W., & Sasson, T. (1992). Media images and the social construction of reality. *Annual review of sociology*, 18(1), 373-393.
- Gao, H., Barbier, G., & Goolsby, R. (2011). Harnessing the crowdsourcing power of social media for disaster relief. *IEEE Intelligent Systems*, 26(3), 10-14.
- Geertz, C. (1973). *The interpretation of cultures* (Vol. 5019). Basic books.
- Geoghegan, T., & Renard, Y. (2002). Beyond community involvement: lessons from the insular Caribbean. *Parks*, 12(2), 16-27.
- Gephart Jr, R. P. (2004). Sensemaking and new media at work. *American Behavioral Scientist*, 48(4), 479-495.
- Gergen, K. J. (1992). The social constructionist movement in modern psychology.
- Getha-Taylor, H., & Morse, R. S. (2013). Collaborative leadership development for local government officials: Exploring competencies and program impact. *Public Administration Quarterly*, 71-102.
- GFDRR. Volunteer Technology Communities: Open Development, Global Facility for Disaster Reduction and Recovery, World Bank.
- Gibson, C. C., Ostrom, E., & Ahn, T. K. (2000). The concept of scale and the human dimensions of global change: a survey. *Ecological economics*, 32(2), 217-239.
- Gilliam, A., Davis, D., Barrington, T., Lacson, R., Uhl, G., & Phoenix, U. (2002). The value of engaging stakeholders in planning and implementing evaluations. *AIDS Education and Prevention*, 14(3 Supplement), 5-17.

- Glaser, B., Strauss, A., 1967. *The Discovery of Grounded Theory*. Aldine Publishing Company, Hawthorne, NY
- Global Alliance for Humanitarian Innovation. (2019, July 16). *Humanitarian Data Governance Frameworks: Guide and Literature Review - World*. Retrieved January 02, 2021, from <https://reliefweb.int/report/world/humanitarian-data-governance-frameworks-guide-and-literature-review>
- Global humanitarian assistance report. United Nations. 2015.
- Global Solutions Network (2014). *Digital Humanitarian Network: Leveraging Digital Networks for Humanitarian Response-Lighthouse Case Study*. Retrieved May, 20, 2016.
- Goodchild, M. F., & Glennon, J. A. (2010). Crowdsourcing geographic information for disaster response: a research frontier. *International Journal of Digital Earth*, 3(3), 231-241.
- Goodchild, M. F., & Li, L. (2012). Assuring the quality of volunteered geographic information. *Spatial statistics*, 1, 110-120.
- Golden-Biddle, K., & Locke, K. (2006). *Composing qualitative research*. Sage Publications.
- Graneheim, U. H., & Lundman, B. (2004). Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse education today*, 24(2), 105-112.
- Granovetter, M. (1985). Economic action and social structure: The problem of embeddedness. *American journal of sociology*, 91(3), 481-510.
- Gray, B. (1989). *Collaborating: Finding common ground for multiparty problems*.
- Gray, B. (1998). Collaboration: The constructive management of differences. In G. R. Hickman (Ed.), *Leading organizations: Perspectives for a new era* (pp. 467-480). Thousand Oaks, CA, US: Sage Publications, Inc. (Reprinted from B. Gray, *Collaboration: Finding Common Ground for Multiparty Problems*, Jossey-Bass Inc, 1989, pp. 1-25.
- Gray, B. (2000). "Assessing inter-organizational collaboration: Multiple conceptions and multiple methods." *Cooperative strategy: Economic, business, and organizational issues*, 243-260.
- Gray, B. (2008). Enhancing transdisciplinary research through collaborative leadership. *American journal of preventive medicine*, 35(2), S124-S132.
- Gray, B., & Wood, D. J. (1991). Collaborative alliances: Moving from practice to theory. *The Journal of Applied Behavioral Science*, 27(1), 3-22.
- Gunasekaran, A., Papadopoulos, T., Dubey, R., Wamba, S. F., Childe, S. J., Hazen, B., & Akter, S. (2017). Big data and predictive analytics for supply chain and organizational performance. *Journal of Business Research*, 70, 308-317.
- Guan, X., & Chen, C. (2014). Using social media data to understand and assess disasters. *Natural hazards*, 74(2), 837-850.
- Gupta, S., Altay, N., & Luo, Z. (2019). Big data in humanitarian supply chain management: A review and further research directions. *Annals of Operations Research*, 283(1), 1153-1173.
- Hacking, I., & Hacking, J. (1999). *The social construction of what?*. Harvard university press.
- Harvard Humanitarian Initiative. (2010). *Disaster relief 2.0: The future of information sharing in humanitarian emergencies*. In *Disaster Relief 2.0: The future of information sharing in humanitarian emergencies*. HHI; United Nations Foundation; OCHA; The Vodafone Foundation.
- Haworth, B., & Bruce, E. (2015). A review of volunteered geographic information for disaster management. *Geography Compass*, 9(5), 237-250.
- Haythornthwaite, C. (2005). Social networks and Internet connectivity effects. *Information, Community & Society*, 8(2), 125-147.

- Heikkilä, T., & Gerlak, A. K. (2005). The formation of large-scale collaborative resource management institutions: Clarifying the roles of stakeholders, science, and institutions. *Policy Studies Journal*, 33(4), 583-612.
- Herfort, B., Eckle, M., de Albuquerque, J. P., & Zipf, A. (2015, May). Towards assessing the quality of volunteered geographic information from OpenStreetMap for identifying critical infrastructures. In ISCRAM.
- Hewko, J. (2018, March 01). Peace in the Age of Big Data. Retrieved January 21, 2021, from <https://medium.com/rotary/peace-in-the-age-of-big-data-fe77d20f5709>
- Hilhorst, D., & Schmiemann, N. (2002). Humanitarian principles and organizational culture: Everyday practice in Médecins Sans Frontières-Holland. *Development in Practice*, 12(3-4), 490-500.
- Hilhorst, D., & Jansen, B. J. (2010). Humanitarian space as an arena: a perspective on the everyday politics of aid. *Development and Change*, 41(6), 1117-1139.
- Hiltz, S. R., Gonzalez, J. J., & Turoff, M. (2013). ICT support and the effectiveness of decision making in disasters: A preliminary system dynamics model. In ISCRAM.
- Hiltz, S. R., Kushma, J., & Plotnick, L. (2014). Use of social media by US public sector emergency managers: barriers and wish lists. *Proceedings of ISCRAM*, 279.
- Horita, F. E. A., Degrossi, L. C., de Assis, L. F. G., Zipf, A., & de Albuquerque, J. P. (2013). The use of volunteered geographic information (VGI) and crowdsourcing in disaster management: a systematic literature review.
- Houston, J. B., Hawthorne, J., Perreault, M. F., Park, E. H., Goldstein Hode, M., Halliwell, M. R., ... & Griffith, S. A. (2015). Social media and disasters: a functional framework for social media use in disaster planning, response, and research. *Disasters*, 39(1), 1-22.
- Howe, J. (2008). *Crowdsourcing: How the power of the crowd is driving the future of business*. Random House.
- Hundley, N. (2001). *The great thirst: Californians and water—A history*. Univ of California Press.
- Hufty, M. (2011). Investigating Policy Processes: The Governance Analytical Framework (GAF). In U. Wiesman & H. Hurni (Eds.), *Geographica Bernensia* (pp. 403-424).
- Hughes, A. L., & Palen, L. (2009). Twitter adoption and use in mass convergence and emergency events. *International journal of emergency management*, 6(3-4), 248-260.
- Hughes, A. L., & Tapia, A. H. (2015). Social media in crisis: When professional responders meet digital volunteers. *Journal of Homeland Security and Emergency Management*, 12(3), 679-706.
- Hunt, A., & Specht, D. (2019). Crowdsourced mapping in crisis zones: collaboration, organisation and impact. *Journal of International Humanitarian Action*, 4(1), 1-11.
- Hudson, B., & Hardy, B. (2002). What is a 'successful' partnership and how can it be measured. *Partnerships, new labour and the governance of welfare*, 51-65.
- Huxham, C. (Ed.). (1996). *Creating collaborative advantage*. Sage.
- Huxham, C., Vangen, S., Huxham, C., & Eden, C. (2000). The challenge of collaborative governance. *Public Management and International Journal of Research and Theory*, 2(3), 337-358.
- Imran, M., Castillo, C., Lucas, J., Meier, P., & Vieweg, S. (2014, April). AIDR: Artificial intelligence for disaster response. In *Proceedings of the 23rd International Conference on World Wide Web* (pp. 159-162).
- Inter-Agency Standing Committee. (2015). *IASC Reference Module for the Implementation of the Humanitarian Programme Cycle*.

- Innes, J. E., & Booher, D. E. (1999). Consensus building and complex adaptive systems: A framework for evaluating collaborative planning. *Journal of the American planning association*, 65(4), 412-423.
- International Displacement Monitoring Centre [IDMC]. (2011) Displacement Due to Natural Hazard-induced Disasters: Global Estimates for 2009 and 2010. Geneva: IDMC. June.
- International Committee of the Red Cross. (2016, August 11). Retrieved December 29, 2020, from <https://www.icrc.org/en/who-we-are>
- International Federation of Red Cross and Red Crescent Societies (IFRC). (n.d.). Retrieved December 29, 2020, from <https://www.ifrc.org/en/who-we-are/the-movement/ifrc/>
- "Information Management and the Humanitarian Context" (OCHA IM Guideliens_Ver.2.1. _draft0.1, pp. 1-10, Publication). (n.d.). Geneva, Switzerland: United Nations Office for the Coordination of Humanitarian Affairs. doi:<http://cpwg.net/wpcontent/uploads/sites/2/2014/07/OCHA-What-IM-Guidelines-ENG.pdf>.
- Isabella, L. A. (1990). Evolving interpretations as a change unfolds: How managers construe key organizational events. *Academy of Management journal*, 33(1), 7-41.
- Jackson, A. (2012) Talking to the Other Side: Humanitarian Engagement with Armed Non-state Actors. HPG Policy Brief 47. London: ODI.
- Jackson, A. Y., & Mazzei, L. (2011). Thinking with theory in qualitative research: Viewing data across multiple perspectives. Routledge.
- Jensen, C. B., & Winthereik, B. R. (2013). Monitoring movements in development aid: recursive partnerships and infrastructures. MIT Press.
- Jensen, J. N. (2019). Collaborative Governance in Public-Private Partnerships (Doctoral dissertation, Mailman School of Public Health, Columbia University).
- Jiang, M., & McGill, W. L. (2010). Human-centered sensing for crisis response and management analysis campaigns. *Proceedings of Information Systems for Crisis Response and Management, ISCRAM*, 10.
- Johnson, S. B. (2016). HXL is Creating Efficiency at the IFRC. Retrieved May 14, 2017, from <https://centre.humdata.org/hxl-is-creating-efficiency-at-the-ifrc/>
- Grønnegård, J.C. (2018). Bureaucrats as Evidence Brokers.
- Kallis, G., Butler, D., 2001. The EU water framework directive: measures and implications. *Water Policy* 3 (3), 125–142.
- Kallis, G., Kiparsky, M., & Norgaard, R. (2009). Collaborative governance and adaptive management: Lessons from California's CALFED Water Program. *environmental science & policy*, 12(6), 631-643.
- Keim, M. E., & Noji, E. (2011). Emergent use of social media: a new age of opportunity for disaster resilience. *American journal of disaster medicine*, 6(1), 47-54.
- Kendra, J. M., & Wachtendorf, T. (2003). Elements of resilience after the world trade center disaster: reconstituting New York City's Emergency Operations Centre. *Disasters*, 27(1), 37-53.
- Kennedy, D. (2012). Codified Compassion: Politics and Principles in Humanitarian Governance. PhD diss., Dep.Polit. Sci., Univ.Minn.
- Kenton, W. (2020, December 14). Food and Agriculture Organization (FAO) Definition. Retrieved December 29, 2020, from <https://www.investopedia.com/terms/f/food-agriculture-organization-fao.asp>
- Kevlihan, R., DeRouen Jr, K., & Biglaiser, G. (2014). Is US humanitarian aid based primarily on need or self-interest?. *International Studies Quarterly*, 58(4), 839-854.

- Kettl, D. F. (2002). Managing indirect government. *The tools of government: A guide to the new governance*, 490-510.
- Klijn, E. H., Edelenbos, J., & Steijn, B. (2010). Trust in governance networks: Its impacts on outcomes. *Administration & Society*, 42(2), 193-221.
- Koch Jr, C. H. (2005). Collaborative Governance in the Restructured Electricity Industry. *Wake Forest L. Rev.*, 40, 589.
- Kraft, M., & Johnson, B. N. (1999). Clean water and the promise of collaborative decision making: The case of the Fox-Wolf Basin in Wisconsin. Toward sustainable communities: Transition and transformations in environmental policy, ed. D. Mazmanian and M. Kraft, 113-52.
- Kumar, A., Vishwakarma, N. K., & Upadhyay, P. (2020, December). Digital Humanitarianism in a Pandemic Outbreak: An Empirical Study of Antecedents and Consequences. In *International Working Conference on Transfer and Diffusion of IT* (pp. 24-32). Springer, Cham.
- Kvale, S., & Brinkman, S. (2009). Interview quality. *Interviews: Learning the craft of qualitative research interviewing*, 161-175.
- Labov W. 1972. *Language in the Inner City*. Philadelphia: Univ. Pa. Press
- Labov, W., & Waletzky, J. (1997). Narrative analysis: Oral versions of personal experience.
- Lang, A. (2019). Collaborative governance in health and technology policy: The use and effects of procedural policy instruments. *Administration & Society*, 51(2), 272-298.
- Lasker, R. D., & Weiss, E. S. (2003). Creating partnership synergy: the critical role of community stakeholders. *Journal of health and human services administration*, 119-139.
- Lawrence, T. B., Hardy, C., & Phillips, N. (2002). Institutional effects of interorganizational collaboration: The emergence of proto institutions. *Academy of management journal*, 45(1), 281-290.
- Leach, W. D., & Sabatier, P. A. (2005). To trust an adversary: Integrating rational and psychological models of collaborative policymaking. *American Political Science Review*, 491-503.
- Leitner, P., & Grechenig, T. (2008). Collaborative shopping networks: Sharing the wisdom of crowds in E-commerce environments. *BLED 2008 Proceedings*, 21.
- Lemos, M.C., Agrawal, A., 2006. Environmental governance. *Annual Review of Environment and Resources* 31, 297-325.
- Léonard, S. (2010). EU border security and migration into the European Union: FRONTEX and securitisation through practices. *European security*, 19(2), 231-254.
- Li, N., Yang, Z., Ghahramani, A., Becerik-Gerber, B., & Soibelman, L. (2014). Situational awareness for supporting building fire emergency response: Information needs, information sources, and implementation requirements. *Fire safety journal*, 63, 17-28.
- Lindblom, C. E. (1959). The science of "muddling through". *Public administration review*, 79-88.
- Lindblom, C. E. (1979). Still muddling, not yet through. *Public administration review*, 39(6), 517-526.
- Linderoth, H. C. (2017). From visions to practice—The role of sensemaking, institutional logic and pragmatic practice. *Construction management and economics*, 35(6), 324-337.
- Liu, S. B. (2014). Crisis crowdsourcing framework: Designing strategic configurations of crowdsourcing for the emergency management domain. *Computer Supported Cooperative Work (CSCW)*, 23(4-6), 389-443.
- Lohne, K., & Sandvik, K. B. (2017). Bringing law into the political sociology of humanitarianism. *Oslo Law Review*, 4(01), 4-27.
- Long, J. C., Cunningham, F. C., & Braithwaite, J. (2013). Bridges, brokers and boundary spanners in collaborative networks: a systematic review. *BMC health services research*, 13(1), 158.

- Logsdon, J. M. (1991). Interests and interdependence in the formation of social problem-solving collaborations. *The Journal of applied behavioral science*, 27(1), 23-37.
- Luhmann, N. (2000). Familiarity, confidence, trust: Problems and alternatives. *Trust: Making and breaking cooperative relations*, 6(1), 94-107.
- Lutterbeck, D., 2006. Policing migration in the Mediterranean. *Mediterranean politics*, 11 (1), 5982.
- Lyon, D. (Ed.). (2006). *Theorizing surveillance*. Routledge.
- MacDonald, C. (2012). Understanding participatory action research: A qualitative research methodology option. *The Canadian Journal of Action Research*, 13(2), 34-50.
- Maitlis, S. (2005). The social processes of organizational sensemaking. *Academy of management journal*, 48(1), 21-49.
- Malone, T. W., Laubacher, R., & Dellarocas, C. (2009). Harnessing crowds: Mapping the genome of collective intelligence.
- Mancini, F., and M. O'Reilly. "New Technology and the Prevention of Violence and Conflict." *Stability* 2, no. 3 (2013): 1-9.
- Margerum, R. D. (2002). Collaborative planning: Building consensus and building a distinct model for practice. *Journal of planning education and research*, 21(3), 237-253.
- Mattessich, P. W., & Monsey, B. R. (1992). Collaboration: what makes it work. A review of research literature on factors influencing successful collaboration. Amherst H. Wilder Foundation, 919 Lafond, St. Paul, MN 55104.
- Mauroner, O., & Heudorfer, A. (2016). Social media in disaster management: How social media impact the work of volunteer groups and aid organizations in disaster preparation and response. *International Journal of Emergency Management*, 12(2), 196-217.
- Mayer, M., & Kenter, R. (2015). The prevailing elements of public-sector collaboration. *Advancing collaboration theory: Models, typologies, and evidence*, 13, 43-64.
- McFalls, L. (2010). Benevolent dictatorship: The formal logic of humanitarian government. *Contemporary states of emergency: The politics of military and humanitarian interventions*, 317-334.
- Melamed, C., & Cameron, G. (2015, January 20). Funding the Data Revolution. Retrieved December 02, 2020, from <https://www.undatarevolution.org/2015/01/20/funding-data-revolution/>
- Meier, P. (2012, April 09). Does the Humanitarian Industry Have a Future in The Digital Age? Retrieved May 17, 2018, from <https://irevolutions.org/tag/libya/>.
- Meier, P. (2015). *Digital Humanitarians: How Big Data Is Changing the Face of Humanitarian Response*. Published by Routledge. London, UK.
- Meier, P., Valuch, J., Munro, R., Iacucci, A., & Larrauri, H.P. (2011). Why We Need a Disaster 2.1 Report. Standby Task Force blog. Available at: <http://blog.standbytaskforce.com/?p=456>.
- Meissner, D. (2019). Public-private partnership models for science, technology, and innovation cooperation. *Journal of the Knowledge Economy*, 10(4), 1341-1361.
- Metcalfe, V., A. Giffen and S. Elhawary (2011) UN Integration and Humanitarian Space. An Independent Study Commissioned by the UN Integration Steering Group. HPG Commissioned Paper. London: ODI and Stimson Center.
- Merkhofer, M. W., Conway, R., & Anderson, R. G. (1997). Multiattribute utility analysis as a framework for public participation in siting a hazardous waste management facility. *Environmental Management*, 21(6), 831-839.
- Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation* (3rd ed). San Francisco, CA: Jossey-Bass

- Meyerson, D., Weick, K. E., & Kramer, R. M. (1996). Swift trust and temporary groups. *Trust in organizations: Frontiers of theory and research*, 166, 195.
- Middleton, S. E., Middleton, L., & Modafferi, S. (2013). Real-time crisis mapping of natural disasters using social media. *IEEE Intelligent Systems*, 29(2), 9-17.
- Milner, M. E., & Verity, A. (2013). Collaborative Innovation in Humanitarian Affairs—Organization and Governance in the Era of Digital Humanitarianism. Digital Humanitarian Network.
- Minn, P. (2007). Toward an anthropology of humanitarianism. *Journal of Humanitarian Assistance*, 6.
- Möllering, G. (2001). The nature of trust: From Georg Simmel to a theory of expectation, interpretation, and suspension. *Sociology*, 35(2), 403-420.
- Mohammed, S., Ferzandi, L., & Hamilton, K. (2010). Metaphor no more: A 15-year review of the team mental model construct. *Journal of management*, 36(4), 876-910.
- Moore, R. (2016a). "Digital Humanitarian Activation Form" [Excel]. Geneva, Switzerland: UNOCHA.
- Moore, R. (February, 2016b). "Humanitarian I.M. failures survey". Geneva, Switzerland: UNOCHA.
- Moore, R. (February, 2016c). "DHN Nonprofit 2.0". Geneva, Switzerland: UNOCHA.
- Morse, R. S., & Stephens, J. B. (2012). Teaching collaborative governance: Phases, competencies, and case-based learning. *Journal of Public Affairs Education*, 18(3), 565-583.
- Morris, C. R. (1989). The coming global boom. *The Atlantic Monthly*, 264(4), 51-72.
- Muhren, W. J., Van Den Eede, G., & Van de Walle, B. (2009). Making sense of media synchronicity in humanitarian crises. *IEEE Transactions on Professional Communication*, 52(4), 377-397.
- Muhren, W. J., & Van de Walle, B. (2010). Sense-making and information management in emergency response. *Bulletin of the American Society for Information Science and Technology*, 36(5), 30-33.
- Mulder, F., Ferguson, J., Groenewegen, P., Boersma, K., & Wolbers, J. (2016). Questioning Big Data: Crowdsourcing crisis data towards an inclusive humanitarian response. *Big Data & Society*, 3(2), 2053951716662054.
- Murdock, B. S., Wiessner, C., & Sexton, K. (2005). Stakeholder participation in voluntary environmental agreements: Analysis of 10 Project XL case studies. *Science, technology, & human values*, 30(2), 223-250.
- Myers, M. D., & Avison, D. (Eds.). (2002). *Qualitative research in information systems: a reader*. Sage.
- Naisbitt, J., & Aburdene, P. (1990). *Megatrends 2000*. 1990. New York: William Morrow
- Nelson, C. B., Steckler, B. D., & Stamberger, J. A. (2011, October). The evolution of hastily formed networks for disaster response: technologies, case studies, and future trends. In *2011 IEEE Global humanitarian technology conference* (pp. 467-475). IEEE.
- Ngamassi, L., Maitland, C., & Tapia, A. H. (2014). Humanitarian inter-organizational information exchange network: how do clique structures impact network effectiveness? *VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations*, 25(6), 1483-1508.
- Nisar, M. A. (2018). Children of a lesser god: Administrative burden and social equity in citizen-state interactions. *Journal of Public Administration Research and Theory*, 28(1), 104-119.
- Nocon, A. (1994). *Collaboration in Community Care in the 1990s*. Business Education Publishers.
- Norris, W. (2020). DIGITAL HUMANITARIANS Citizen journalists on the virtual front. Mapping Citizen and Participatory Journalism in Newsrooms, Classrooms, and Beyond.
- Norris. (2016). New York, NY: UNOCHA.
- "Organizing Principles and Policies", 2009. GISCorps.

- http://www.giscorps.org/index.php?option¼com_content&task¼view&id¼9&Itemid¼54. [Accessed 23 December 2017].
- Orlikowski, W. J., & Baroudi, J. J. (1991). Studying information technology in organizations: Research approaches and assumptions. *Information systems research*, 2(1), 1-28.
- O'Neil, C., & Schutt, R. (2013). Doing data science: Straight talk from the frontline. " O'Reilly Media, Inc."
- Ortt, R., Bücker, C., & Klein, S. (2016). Handbook on networks in innovation and crisis management: Theory and practice in a dynamic and disruptive environment.
- Osborne, D. G. (1992). T. Reinventing government, how the entrepreneurial spirit is transforming the public sector.
- Osborne, D., & Gaebler, T. (1995). Reinventing government. *Journal of Leisure Research*, 27(3), 302.
- Ostrom, E. (1990). Governing the commons: The evolution of institutions for collective action. Cambridge university press.
- Ostrom, E. (2014). Collective action and the evolution of social norms. *Journal of Natural Resources Policy Research*, 6(4), 235-252.
- Oxford Dictionary. (n.d.). Definition for Big Data. Retrieved January 02, 2021, from <https://www.oxfordlearnersdictionaries.com/definition/english/big-data>
- Ozawa, C. P. (1993). Improving citizen participation in environmental decision-making: The use of transformative mediator techniques. *Environment and Planning C: Government and Policy*, 11(1), 103-117.
- Ozawa, C. P. (2019). Recasting science: Consensual procedures in public policy making. Routledge.
- Padilla, Yolanda C., and Lesley E. Daigle. 1998. Inter-agency collaboration in an international setting. *Administration in Social Work* 22 (1): 65–81.
- Palen, L. (2008). Online social media in crisis events. *Educause quarterly*, 31(3), 76-78.
- Palen, L., Anderson, K. M., Mark, G., Martin, J., Sicker, D., Palmer, M., & Grunwald, D. (2010). A vision for technology-mediated support for public participation & assistance in mass emergencies & disasters. *ACM-BCS Visions of Computer Science* 2010, 1-12.
- Palen, L., & Hughes, A. L. (2018). Social media in disaster communication. In *Handbook of disaster research* (pp. 497-518). Springer, Cham.
- Papailias, P. (2019) (Un)seeing dead refugee bodies: mourning memes, spectropolitics, and the haunting of Europe. *Media, Culture & Society*, 41(8), pp. 1048-1068.
- Phares, D. (Ed.). (2004). Metropolitan governance without metropolitan government?. Gower Publishing, Ltd..
- Plummer, R., & Fitzgibbon, J. (2004). Co-management of natural resources: a proposed framework. *Environmental management*, 33(6), 876-885.
- Poblet, M., García-Cuesta, E., & Casanovas, P. (2013, December). Crowdsourcing tools for disaster management: A review of platforms and methods. In *International Workshop on AI Approaches to the Complexity of Legal Systems* (pp. 261-274). Springer, Berlin, Heidelberg.
- Poblet, M., García-Cuesta, E., & Casanovas, P. (2018). Crowdsourcing roles, methods, and tools for data-intensive disaster management. *Information Systems Frontiers*, 20(6), 1363-1379.s
- Polman, L. (2010). *The crisis caravan: what's wrong with humanitarian aid?* Metropolitan Books.
- Powell, W. (1990). Neither markets nor hierarchy: network forms of organization. *Res. Organ. Behav.* 12:295– 336.
- Powell, W. W. (1996). Trust-Based Forms of Governance. *Trust in organizations: Frontiers of theory and research*, 51.

- Prpic, J., & Shukla, P. (2013, January). The theory of crowd capital. In 2013 46th Hawaii International Conference on System Sciences (pp. 3505-3514). IEEE.
- Provan, K. G. (1993). Embeddedness, interdependence, and opportunism in organizational supplier-buyer networks. *Journal of management*, 19(4), 841-856.
- Prutsalis, M. (2010). Developing a Service Industry to Support the Sahana Disaster Management System. *Open Source Business Resource*, (December 2010).
- Qadir, J., Ali, A., ur Rasool, R., Zwitter, A., Sathiaselalan, A., & Crowcroft, J. (2016). Crisis analytics: big data-driven crisis response. *Journal of International Humanitarian Action*, 1(1), 1-21.
- Quinn, A. J., & Bederson, B. B. (2011, May). Human computation: a survey and taxonomy of a growing field. In *Proceedings of the SIGCHI conference on human factors in computing systems* (pp. 1403-1412).
- Racette, M. P., Smith, C. T., Cunningham, M. P., Heekin, T. A., Lemley, J. P., & Mathieu, R. S. (2014, April). Improving situational awareness for humanitarian logistics through predictive modeling. In 2014 Systems and Information Engineering Design Symposium (SIEDS) (pp. 334-339). IEEE.
- Rasche, A., Waddock, S., & McIntosh, M. (2013). The United Nations global compact: Retrospect and prospect. *Business & Society*, 52(1), 6-30.
- Read, R., Taithe, B., & Mac Ginty, R. (2016). Data hubris? Humanitarian information systems and the mirage of technology. *Third World Quarterly*, 37(8), 1314-1331.
- Reidenberg, J. R., Gellman, R., Debelak, J., Elewa, A., & Liu, N. (2013). Privacy and missing persons after natural disasters. *Commons Lab, Woodrow Wilson International Center for Scholars*, 2.
- Reilly, B. (2001). *Democracy in divided societies: Electoral engineering for conflict management*. Cambridge University Press.
- Reindorp, N., & Wiles, P. (2001). *Humanitarian Coordination: Lessons from recent field experience* (p. 9). London: Overseas Development Institute.
- Riessman, C. K. (2008). Thematic analysis. *Narrative methods for the human sciences*, 456, 53-76.
- Resor, E. (2016). The Neo-Humanitarians: Assessing the Credibility of Organized Volunteer Crisis Mappers. *Policy & Internet*, 8(1), 34-54.
- Reynolds, B., & Seeger, M. (2005). Crisis and emergency risk communication as an integrative model. *Journal of health communication*, 10(1), 43-55.
- Reynolds, B., Seeger, M., & Palenchar, M. (2012). *Crisis and Emergency Risk Communication: 2012 Edition*. Atlanta, GA: Centers for Disease Control and Prevention.
- Rochlin, S. A., Zadek, S., & Forstater, M. (2008). *Governing Collaboration: Making partnerships accountable for delivering development*. AccountAbility.
- Rosen, R. (1991). *Life itself: a comprehensive inquiry into the nature, origin, and fabrication of life*. Columbia University Press.
- Rosenthal, U., Boin, A., & Comfort, L. K. (2001). *Managing crises: Threats, dilemmas, opportunities*. Charles C Thomas Publisher.
- Rogers, E. *The Diffusion of Innovation*. 4th ed. New York: Free Press, 1995.
- Rogers, T., Howard-Pitney, B., Feighery E.C., Altman D., Endres, J.M and Roeseler, A.G. (1993). Characteristics and participant perceptions of tobacco control coalitions in California. *Health Education Research, Theory & Practice* 8:345–57.
- Roth, S., & Luczak-Roesch, M. (2020). Deconstructing the data life cycle in digital humanitarianism. *Information, Communication & Society*, 23(4), 555-571.
- Rubin, H. (2009). *Collaborative leadership: Developing effective partnerships for communities and schools*. Corwin Press.

- Ruggles, R. (2009). *Knowledge management tools*. Routledge.
- Ryan, J. M. (1987). *Strategy Change and Defensive Routines*, by Chris Argyris. Boston, MA: Pitman, 1985, 386 pp., no price given. *Action Science*, by Chris Argyris, Robert Putnam, and Diana McLain Smith. San Francisco, CA: Jossey-Bass, 1985, 480 pp., \$29.95, cloth. *Human Resource Management*, 26(3), 425-429.
- Saab, D. J., Maldonado, E., Orendovici, R., Tchouakeu, L. M., van Gorp, A., Zhao, K., ... & Tapia, A. H. (2008, May). Building global bridges: Coordination bodies for improved information sharing among humanitarian relief agencies. In *Proceedings of the 5th International ISCRAM Conference* (Vol. 5).
- Saab, D. J., Tapia, A., Maitland, C., Maldonado, E., & Tchouakeu, L. M. N. (2013). Inter-organizational coordination in the wild: trust building and collaboration among field-level ICT workers in humanitarian relief organizations. *Voluntas: International Journal of Voluntary and Nonprofit Organizations*, 24(1), 194-213.
- Saarikoski, H. (2000). Environmental impact assessment (EIA) as collaborative learning process. *Environmental impact assessment review*, 20(6), 681-700.
- Sabatier, P. A., & Weible, C. M. (2007). The advocacy coalition framework. *Theories of the policy process*, 2, 189-220.
- Sabou, J., Noori, N., & Husch, J. (2015). Recognizing Competitive Cultures: A case for describing the complexity of coordination between dynamic crisis response actors. In *ISCRAM*.
- Sabou, J., & Klein, S. (2016). How Virtual and Technical Communities Can Contribute to Un Led Humanitarian Relief Operations-Boundary Spanning and the Exploration of Collaborative Information Practices.
- Sabou, J., & Videlov, S. (2016). An Analysis on the Role of Trust in Digital Humanitarian Actor Networks. In *ISCRAM*.
- Sagun, A., Bouchlaghem, D., & Anumba, C. J. (2009). A scenario-based study on information flow and collaboration patterns in disaster management. *Disasters*, 33(2), 214-238.
- Salkowe, R. S., & Chakraborty, J. (2009). Federal disaster relief in the US: The role of political partisanship and preference in presidential disaster declarations and turndowns. *Journal of Homeland Security and Emergency Management*, 6(1).
- Saldaña, J. (2009). *The coding manual for qualitative researchers*. Thousand Oaks, CA: Sage Publications, Inc. Retrieved from http://stevescollection.weebly.com/uploads/1/3/8/6/13866629/saldana_2009_thecoding-manual-for-qualitative-researchers.pdf
- Salvador, A. B., & Ikeda, A. A. (2018). Brand crisis management: the use of information for prevention, identification and management. *Revista Brasileira de Gestão de Negócios*, 20(1), 74-91.
- Save the Children Foundation. (n.d.). Retrieved December 29, 2020, from <https://www.britannica.com/topic/Save-the-Children>
- Saxton, G. D., Oh, O., & Kishore, R. (2013). Rules of crowdsourcing: Models, issues, and systems of control. *Information Systems Management*, 30(1), 2-20.
- Schenk, T. (2016). Facts for now, facts for use: satisficing and adapting in joint fact-finding. In *Joint Fact-Finding in Urban Planning and Environmental Disputes* (pp. 102-119). Routledge.
- Shuckman, M. (2001). Making the hard choices: a collaborative governance model for the biodiversity context. *Wash. ULQ*, 79, 343.
- Schon, D. A. (1984). *The reflective practitioner: How professionals think in action* (Vol. 5126). Basic books.
- Scott-Smith, T. (2016). Humanitarian neophilia: the 'innovation turn' and its implications. *Third World Quarterly*, 37(12), 2229-2251.

- Scott, T. A., Thomas, C. W., & Magallanes, J. M. (2019). Convening for consensus: Simulating stakeholder agreement in collaborative governance processes under different network conditions. *Journal of Public Administration Research and Theory*, 29(1), 32-49.
- Seebode, D., Jeanrenaud, S., & Bessant, J. (2012). Managing innovation for sustainability. *R&D Management*, 42(3), 195-206.
- Shanley, L., Burns, R., Bastian, Z., & Robson, E. (2013). Tweeting up a storm: the promise and perils of crisis mapping. Available at SSRN 2464599.
- Shahi, A. Is Humanitarianism in conflict with Realpolitik?.
- Sheet, G. S. H. F. (2007). United Nations Office for the Coordination of Humanitarian Affairs.
- Short, C., & Winter, M. (1999). The problem of common land: Towards stakeholder governance. *Journal of Environmental Planning and Management*, 42(5), 613-630.
- Siemen, C., dos Santos Rocha, R., van den Berg, R. P., Hellingrath, B., & Albuquerque, J. P. D. (2017, March). Collaboration among humanitarian relief organizations and volunteer technical communities: identifying research opportunities and challenges through a systematic literature review. In *Proceedings of the 14th ISCRAM Conference*.
- Silvia, C. (2018). Picking the team: A preliminary experimental study of the activation of collaborative network members. *Journal of Public Administration Research and Theory*, 28(1), 120-137.
- Slaughter, A.M. (2005). *A New World Order*. Princeton, NJ: Princeton Univ. Press.
- Smith, S. L. (1998). Collaborative approaches to Pacific Northwest fisheries management: The salmon experience. *Willamette Journal of International Law and Dispute Resolution*, 6(1), 29-68.
- Smith, W., & Dowell, J. (2000). A case study of coordinative decision-making in disaster management. *Ergonomics*, 43(8), 1153-1166.
- Soden, R., & Palen, L. (2014). From crowdsourced mapping to community mapping: The post-earthquake work of OpenStreetMap Haiti. In *COOP 2014-Proceedings of the 11th International Conference on the Design of Cooperative Systems*, 27-30 May 2014, Nice (France) (pp. 311-326). Springer, Cham.
- Solís, P., Rajagopalan, S., Villa, L., Mohiuddin, M. B., Boateng, E., Wavamunno Nakacwa, S., & Peña Valencia, M. F. (2020). Digital humanitarians for the Sustainable Development Goals: YouthMappers as a hybrid movement. *Journal of Geography in Higher Education*, 1-21.
- Solnit, R. (2009). *A paradise built in hell. The Extraordinary Communities that Arise in Disaster*. New York: Viking.
- Spradley, J. (1979). Asking descriptive questions. *The ethnographic interview*, 1, 44-61.
- Spradley, J. P. (2016). *Participant observation*. Waveland Press.
- Stanton-Geddes, Z (2014 November 15). OpenStreetMap volunteers map Typhoon Haiyan-affected areas to support Philippines relief and recovery efforts. World Bank. From <http://blogs.worldbank.org/eastasiapacific/openstreetmap-volunteers-map-typhoon-haiyan-affected-areas-support-philippines-relief-and-recovery>. 23.09.2016.
- Starbird, K. (2012). *Crowdwork, crisis and convergence: how the connected crowd organizes information during mass disruption events* (Doctoral dissertation, University of Colorado at Boulder).
- Starbird, K, Palen, L, Hughes, A & Vieweg, S. 2010. Chatter on The Red: What Hazards Threat Reveals about the Social Life of Microblogged Information. *Proc. of CSCW*, pp. 241-250.
- Starbird, K., & Palen, L. (2011, May). Voluntweeters: Self-organizing by digital volunteers in times of crisis. In *Proceedings of the SIGCHI conference on human factors in computing systems* (pp. 1071-1080). ACM.

- Starbird, K., Muzny, G., & Palen, L. (2012, April). Learning from the crowd: collaborative filtering techniques for identifying on-the-ground Twitterers during mass disruptions. In *Proceedings of 9th International Conference on Information Systems for Crisis Response and Management, ISCRAM*.
- Starman, A. B. (2013). The case study as a type of qualitative research. *Journal of Contemporary Educational Studies/Sodobna Pedagogika*, 64(1).
- Stauffacher, D., Hattotuwa, S., & Weekes, B. (2012). The potential and challenges of open data for Crisis information management and aid efficiency: A preliminary assessment. ICT4 Peace Foundation, 1-9.
- Strauss, A. L. (1987). *Qualitative analysis for social scientists*. Cambridge university press.
- Simon, T., Goldberg, A., & Adini, B. (2015). Socializing in emergencies—A review of the use of social media in emergency situations. *International Journal of Information Management*, 35(5), 609-619.
- Stoddard, A., Harmer, A., Haver, K., Salomons, D., & Wheeler, V. (2007). Cluster approach evaluation. Humanitarian Policy Group.
- Stoddard, A., Harmer, A., & DiDomenico, V. (2009). Providing aid in insecure environments: 2009 update. *HPG Policy Brief*, 34(10).
- Stockton, Nicholas (2004), 'The changing nature of humanitarian crises', *The Humanitarian Decade: Challenges for Humanitarian Assistance in the last decade and into the future*, Vol. II: The development of practice, principles and the humanitarian framework (New York: OCHA), 15-39.
- Stokke, O. (2009). *The un and development: from aid to cooperation*. Indiana University Press.
- Sørensen, E., Hendriks, C. M., Hertting, N., & Edelenbos, J. (2020). Political boundary spanning: politicians at the interface between collaborative governance and representative democracy. *Policy and Society*, 39(4), 530-569.
- Steets, J., Grünewald, F., Binder, A., De Geoffroy, V., Kauffmann, D., Krüger, S., ... & Sokpoh, B. (2010). Cluster approach evaluation 2 synthesis report. *IASC Cluster Approach Evaluation 2nd Phase, Groupe URD and the Global Public Policy Institute*, April.
- Stevens, M., MacDuffie, J. P., & Helper, S. (2015). Reorienting and recalibrating inter-organizational relationships: Strategies for achieving optimal trust. *Organization Studies*, 36(9), 1237-1264.
- Stockton, N. (2004), 'The changing nature of humanitarian crises', *The Humanitarian Decade: Challenges for Humanitarian Assistance in the last decade and into the future*, Vol. II: The development of practice, principles and the humanitarian framework (New York: OCHA), 15-39.
- Stumpfenhorst, M., Stumpfenhorst, R., & Razum, O. (2011). The UN OCHA cluster approach: gaps between theory and practice. *Journal of Public Health*, 19(6), 587-592.
- Susskind, L., & Cruikshank, J. (1987). *Breaking the impasse*. New York.
- Tapia, A., Tchouakeu, L. M. N., Maldonado, E., Zhao, K., Robinson, H., & Maitland, C. (2011). Exploring barriers to coordination between humanitarian NGOs: A comparative case study of two NGO's information technology coordination bodies. *International Journal of Information Systems and Social Change*, 2(2), 1-25.
- Tang, S. Y., & Mazmanian, D. A. (2008). An agenda for the study of collaborative governance. *Unpublished Working Paper*.
- Tatham, P., Pettit, S., Jahre, M., & Jensen, L. M. (2010). Coordination in humanitarian logistics through clusters. *International Journal of Physical Distribution & Logistics Management*.
- Taylor, S. J., & Bogdan, R. (1984). *Introduction to qualitative research methods: The search for meanings*. Wiley-Interscience.

- Termeer, C. J., & Dewulf, A. (2019). A small wins framework to overcome the evaluation paradox of governing wicked problems. *Policy and Society*, 38(2), 298-314.
- Tett, L., Crowther, J., & O'Hara, P. (2003). Collaborative partnerships in community education. *Journal of education policy*, 18(1), 37-51.
- Thomas, A. S., & Kopczak, L. R. (2005). From logistics to supply chain management: the path forward in the humanitarian sector. *Fritz Institute*, 15, 1-15.
- Tomashevsky, B. (1965). *Thematics. Russian formalist criticism: Four essays*, 61-95.
- Thompson, E. P. (1967). Time, work-discipline, and industrial capitalism. Past & present, (38), 56-97.
- Thomson, A. M., & Perry, J. L. (2006). Collaboration processes: Inside the black box. *Public administration review*, 66(s1), 20-32.
- Thomson, A. M., Perry, J. L., & Miller, T. K. (2007). Conceptualizing and measuring collaboration. *Journal of Public Administration Research and Theory*, 19(1), 23-56.
- Thomson, A. M., Perry, J. L., & Miller, T. K. (2009). Conceptualizing and measuring collaboration. *Journal of Public Administration Research and Theory*, 19(1), 23-56.
- Thurlow, A., & Mills, J. H. (2009). Change, talk and sensemaking. *Journal of Organizational Change Management*.
- Tompkins, E. L., & Adger, W. N. (2004). Does adaptive management of natural resources enhance resilience to climate change?. *Ecology and society*, 9(2).
- Torfin, J., Peters, B. G., Pierre, J., & Sørensen, E. (2012). *Interactive governance: Advancing the paradigm*. Oxford University Press on Demand.
- Trompette, P., & Chole, C. (2015, June). Are humanitarian goods a fruitful business? Workshop «Humanitarian Goods. Towards an anthropology of things that care». In Workshop «Humanitarian Goods. Towards an anthropology of things that care».
- Tuomi, I. (1999, January). Data is more than knowledge: Implications of the reversed knowledge hierarchy for knowledge management and organizational memory. In *Proceedings of the 32nd Annual Hawaii International Conference on Systems Sciences*. 1999. HICSS-32. Abstracts and CD-ROM of Full Papers (pp. 12-pp). IEEE.
- Twyford, V., & Twyford, V. (2012). *The Power of 'Co': The Smart Leaders' Guide to Collaborative Governance*. Twyford Consulting.
- Tyler, T. R., & Blader, S. L. (2000). Cooperation in groups: Procedural justice, social identity, and behavioral engagement. Psychology Press.
- Ulibarri, N., & Scott, T. A. (2017). Linking network structure to collaborative governance. *Journal of Public Administration Research and Theory*, 27(1), 163-181.
- United Nations Children's Fund. (2020, December 03). Retrieved December 29, 2020, from <https://www.britannica.com/topic/UNICEF>
- United Nations Development Programme, (n.d.). About us: UNDP" Retrieved December 29, 2020, from <https://www.undp.org/content/undp/en/home/about-us.html>
- United Nations Office for the Coordination of Humanitarian Affairs. (1999). *OCHA orientation handbook on complex emergencies*.
- United Nations Office for the Coordination of Humanitarian Affairs. *Humanitarianism in the Network Age*, OCHA Policy and Studies Series, Geneva, 2013, p. 7.
- United Nations Office for Disaster Risk Reduction (UNDRR). (n.d.). Retrieved December 29, 2020, from <https://www.preventionweb.net/organizations/1171>

- United Nations High Commissioner for Refugees. (n.d.). UN High Commissioner for Refugees (UNHCR). Retrieved December 29, 2020, from <https://www.refworld.org/publisher,UNHCR,,CZE,,,20.html>
- UNISDR. (2005, March). Hyogo framework for action 2005-2015: building the resilience of nations and communities to disasters. In *Extract from the final report of the World Conference on Disaster Reduction (A/CONF. 206/6)* (Vol. 380).
- United Nations, Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters, 22 January 2005, A/CONF.206/6, available at: <https://www.refworld.org/docid/42b98a704.html> [accessed 30 December 2020]
- Van Dooren, W., & Van de Walle, S. (Eds.). (2016). *Performance information in the public sector: How it is used*. Springer.
- Van Gorp, A. F. (2014). Integration of Volunteer and Technical Communities into the Humanitarian Aid Sector: Barriers to Collaboration. In *Proceedings of the Information Systems for Crisis Response and Management Conference (ISCRAM 2014)*.
- Van Gorp, A.F., Pogrebnjakov, N., & Maldonado, E. A. (2015). Just Keep Tweeting: Emergency Responder's Social Media Use Before and During Emergencies. In *23rd European Conference on Information Systems (ECIS) 2015*.
- Van de Walle, B., & Dugdale, J. (2012). Information management and humanitarian relief coordination: findings from the Haiti earthquake response. *International Journal of Business Continuity and Risk Management*, 3(4), 278-305.
- Van de Walle, B., & Comes, T. (2015). On the nature of information management in complex and natural disasters. *Procedia Engineering*, 107, 403-411.
- Van de Walle, B., Turoff, M., & Hiltz, S. R. (2014). *Information systems for emergency management* (Vol. 16). Routledge.
- Van de Walle, B., Van Den Eede, G., & Muhren, W. (2008, May). Humanitarian information management and systems. In *International Workshop on Mobile Information Technology for Emergency Response* (pp. 12-21). Springer, Berlin, Heidelberg.
- Van de Walle, B., Brugghehans, B., & Comes, T. (2016). Improving situation awareness in crisis response teams: An experimental analysis of enriched information and centralized coordination. *International Journal of Human-Computer Studies*, 95, 66-79.
- Van Wassenhove, L. N. (2006). Humanitarian aid logistics: supply chain management in high gear. *Journal of the Operational research Society*, 57(5), 475-489.
- Vangen, S., & Huxham, C. (2003). Nurturing collaborative relations: Building trust in interorganizational collaboration. *The Journal of Applied Behavioral Science*, 39(1), 5-31.
- Verity, A. (2013, March 15). Digital Humanitarian Network and Green Technologies. Retrieved October 16, 2020, from <https://blog.veritythink.com/post/45430815566/digital-humanitarian-network-and-green>.
- Verity, A. (2015, November 06). The co-founder's story: Setting up a digital humanitarian network. Retrieved October 16, 2020, from <https://blog.veritythink.com/post/132620108984/the-co-founders-story-setting-up-a-digital>
- Verity, A., Mackinnon, K., & Link, Y. (2014). *OCHA information management guidance for sudden onset emergencies*. New York: OCHA.
- Vieweg, S., Castillo, C., & Imran, M. (2014, November). Integrating social media communications into the rapid assessment of sudden onset disasters. In *International Conference on Social Informatics* (pp. 444-461). Springer, Cham.
- Vidolov, S. (2014, October). Collaborative re-orderings in humanitarian aid networks. In *International Conference on Information Systems for Crisis Response and Management in Mediterranean Countries* (pp. 120-134). Springer, Cham.

- Vidolov, S., Sabou, J., & Mitev, N. (2019, January). Trust Development in Networked Environments: A Performative Account. In Proceedings of the 52nd Hawaii International Conference on System Sciences.
- Waage, S. A. (2001). (Re) claiming space and place through collaborative planning in rural Oregon. *Political Geography*, 20(7), 839-857.
- Waldman, A., A. Verity, and R. Shadrock, Guidance for Collaborating with Formal Humanitarian Organizations. Digital Humanitarian Network, 2013. <http://unocha.org/node/11528>
- Walsham, G. (1995). Interpretive case studies in IS research: nature and method. *European Journal of information systems*, 4(2), 74-81.
- Walter, U. M., & Petr, C. G. (2000). A template for family-centered interagency collaboration. *Families in Society*, 81(5), 494-503.
- Walters, W. (2017). Live governance, borders, and the time-space of the situation: EUROSUR and the genealogy of bordering in Europe. *Comparative European Politics*, 15(5), 794-817.
- Warner, G. (1997). Participatory management, popular knowledge, and community empowerment: The case of sea urchin harvesting in the Vieux-Fort area of St. Lucia. *Human Ecology* 25:29-46.
- Watson, T. J. (1995). Rhetoric, discourse and argument in organizational sense making: A reflexive tale. *Organization Studies*, 16(5), 805-821.
- Waugh, W. L., & Streib, G. (2006). Collaboration and leadership for effective emergency management. *Public administration review*, 66(s1), 131-140.
- Weber, E. P., & Khademanian, A. M. (1997). From agitation to collaboration: Clearing the air through negotiation. *Public Administration Review*, 396-410.
- Weech-Maldonado, R., & Merrill, S. B. (2000). Building partnerships with the community: lessons from the Camden Health Improvement Learning Collaborative. *Journal of Healthcare Management*, 45(3), 189-205.
- Weick, K. (1988). Enacted sensemaking in crisis situations. *Journal of Management Studies*, 25, 305-317.
- Weick, K. E. (1993). The collapse of sensemaking in organizations: The Mann Gulch disaster. *Administrative science quarterly*, 628-652.
- Weick, K. (1995). *Sensemaking in Organizations*. London: Sage.
- Weick, K. E., Sutcliffe, K. M., & Obstfeld, D. (2005). Organizing and the process of sensemaking. *Organization science*, 16(4), 409-421.
- What is the Cluster Approach? (n.d.). Retrieved March 08, 2018, from <https://www.humanitarianresponse.info/en/about-clusters/what-is-the-cluster-approach>.
- What is Collaborative Governance? (2015, April 20). Retrieved January 25, 2018, from https://web.archive.org/web/20150420002444/http://www.policyconsensus.org/publicsolutions/ps_2.html
- Whipkey, K., & Verity, A. (2015). Guidance for incorporating big data into humanitarian operations. New York: UN-OCHA and the Digital Humanitarian Network's community of interest on Decision Maker's Needs. http://digitalhumanitarians.com/sites/default/files/resource-field_media/IncorporatingBigDataintoHumanitarianOps-2015.pdf. Accessed May 2, 2017.
- White, J. I., & Palen, L. (2015, February). Expertise in the wired wild west. In Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing (pp. 662-675).

- White, J. I., Palen, L., & Anderson, K. M. (2014, February). Digital mobilization in disaster response: the work & self-organization of on-line pet advocates in response to hurricane sandy. In *Proceedings of the 17th ACM conference on Computer supported cooperative work & social computing* (pp. 866-876).
- Whitehead, A. N. (2005). *Principle of Relativity*. Barnes & Noble Publishing.
- Williamson, M., & Griffiths, B. (1996). *Biological invasions*. Springer Science & Business Media.
- Wolcott, H. F. (1994). *Transforming qualitative data: Description, analysis, and interpretation*. Sage.
- Wondolleck, J. M., & Yaffee, S. L. (2000). *Making collaboration work: Lessons from innovation in natural resource management*. Island Press.
- Wong, F. F. (2012). The micro-politics of gender mainstreaming: the administration of policy in humanitarian work in Cambodia. *Gender & Development*, 20(3), 467-480.
- Wood, D. J., & Gray, B. (1991). Toward a comprehensive theory of collaboration. *The Journal of applied behavioral science*, 27(2), 139-162.
- Wood, E. X., & Frazier, T. (2019). Decentralized humanitarian aid deployment: reimagining the delivery of aid. *Journal of Humanitarian Logistics and Supply Chain Management*.
- World Food Programme. (n.d.). Retrieved December 29, 2020, from <https://www.wfp.org/overview>
- World Humanitarian Summit. (2016, March 11). Changing People's Lives: From Delivering Aid to Ending Need; High-Level Leaders' Roundtable - Core Responsibility Four of the Agenda for Humanity - World. Retrieved November 21, 2020, from <https://reliefweb.int/report/world/changing-people-s-lives-delivering-aid-ending-need-high-level-leaders-roundtable-core>
- Van Schaik, E. A. (1993). Work, gender, and culture in the Jamaican community health aide programme.
- Velev, D., & Zlateva, P. (2012). Use of social media in natural disaster management. *International Proceedings of Economic Development and Research*, 39, 41-45.
- Yan, L., & Pedraza-Martinez, A. J. (2019). Social media for disaster management: Operational value of the social conversation. *Production and Operations Management*, 28(10), 2514-2532.
- Yang, T.M. and Maxwell, T.A. (2011), "Information-sharing in public organizations: A literature review of interpersonal, intra-organizational and inter-organizational success factors", *Government Information Quarterly*, Elsevier Inc., Vol. 28 No. 2, pp. 164-175.
- Yuri Takhteyev. 2012. *Coding places: software practice in a South American city*. MIT Press, Cambridge, Mass.
- Ziemke, J. (2012). Crisis mapping: the construction of a new interdisciplinary field?. *Journal of Map & Geography Libraries*, 8(2), 101-117.
- Zook, M., M. Graham, T. Shelton, and S. Gorman. 2010. "Volunteered Geographic Information and Crowdsourcing Disaster Relief: A Case Study of the Haitian Earthquake." *World Medical & Health Policy* 2 (2): 7-28.
- Zucker, L. G. (1987). Institutional theories of organization. *Annual review of sociology*, 13(1), 443-464.

APPENDIX I - INTERVIEW PROTOCOL - GUIDELINES

The interview protocol provides a series of questions to be asked to members of the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA/OCHA) and the Digital Humanitarian Network (DHN). These questions will be directed at the relational aspects of outsourcing data related activities to/from UNOCHA to DHN, considering especially the implications of their informal practices on the normative procedures and protocols for Information Management. My expertise brings to this study focus on micro-level relationships between humanitarian response organizations such as UN OCHA and virtual technical communities such as the *Digital Humanitarian Network*. “Digital Humanitarian Network” (DHN) is but one cluster of informal actors that operate under the umbrella of “DHN” or the broader distributed and technically oriented community. This study’s purpose is twofold: 1) to explore the environment shared by UNOCHA Information Management Officers (IMOs) and DHN Coordinators regarding the relational dynamics involving their interface.

Understanding the emergence of collaborative relationships or landscapes within and between HROs and V&TCs is the object of these interviews. 2) Whether there is a link between outsourcing’s informal behaviors and “added value” of Digital Capacities in Disaster Management. In essence, my questions try to discern how coordination is determined and whether micro level relationships between two differently structured organizations impact the ‘added value’ of requested data as a complementary element to producing better responses during a humanitarian deployment. In particular, I will focus on ‘Information Management Exchange.’ This term is one invented by Field Information Service staff. It has become an informal term for the coordination and social interface of outsourcing certain activities to Digital Capacities outside of the UNOCHA. This activity involves the informal linkages and leverages needed to fill sense-making gaps for Situational Awareness.

Hypothesis: In a networked and distributed environment, social credibility concepts pose a significant element toward the matchmaking of requested “digital activations” or outsourcing of IM services/products. Understanding how things like “trust” and “added value” are conceptualized and developed, especially in differing organizations, we can conceptualize distinct information management regimes. These interviews will generate a narrative that highlights the challenges and the collaborative networks and how the HROs and V&TCs have coped with them.

Goals:

-What are the analytical themes emerging around specific cases of collaboration?

Center questions around the use and dimension of “relations” specific to the context of digital capacities usage.

- Find out the challenges, perceptions, and endeavors to integrate V&TCs into formal collaborative structures--Are they doing something beyond what we know?

[We need more granular information/ data... interactions. local collaborations... cases where it worked well and where it didn't... We want to find out if our take on this process indeed entails changes not just for the V&TCs to become more structured and formalized, but also for HROs to become flatter, less structured, etc.]

INTERVIEW PROTOCOL - Round 1 - Draft of Questions

Questions Regarding goals and interface with Humanitarian Response Organizations (HROs) from the V&TC's perspective.

- What kind of experience do you have working with formal humanitarian organizations?
- Which formal organizations has your group collaborated with? What was the nature of that collaboration?
- What was your opinion on formal organizations before working with them?
- Has your perspective of humanitarian organizations changed after working with them? In what ways?
- How do you generally connect with formal humanitarian organizations? Did you know someone in the organization?
- Did that person become your point of reference/ contact in the organization?
- What was that person's role in the organization?
- What was the nature of your relationship with that contact?
- Did your contact request a specific workload from you? What was it? How did you approach it?
- Did your collaborations begin due to a crisis or for other reasons?
- Were you briefed on the information processes and formatting of information with the formal organization? Why/Why not?
- During the activation, was the formal entity available to respond to inquiries?
- How was your presence received when trying to access data or make inquiries with the formal organization(s)?
- Were the needs of the entity and the project clearly and realistically defined?
- Was your role clearly defined?
- Did your role include acting as a liaison between the formal organization and other clusters within your VTC?

- Did you manage or leverage work through the projection of your identity? In other
- words did you have enough social standing in your community to be able to delegate work to clusters in your network or community?
- How would you do this? To whom would you speak to carry out the work load?
- Were the needs of the entity and the project clearly and realistically defined?
- Was the work flow smooth between your community and the formal entity?
- Did the formal entity provide private feedback and publicly acknowledge the work of the VTC?
- How would an initial connection happen? Who initiated the dialogue and did it lead to a working relationship?
- Did the formal organization understand the work/methodology/structure of the VTCs and understand the implications of working with remote virtual volunteers?
- What advice do you have for the development of new VTCs? Existing relationships between VTCs and formal organizations in the humanitarian/ crisis response sector?
- What is the best strategy to learn about the processes of formal organizations and how can that be applied to the VTC?
- What helped you to better communicate with your counterparts in formal agencies? What challenges did you overcome? Did you come up with an innovative way to circumvent institutional barriers? What were the institutional barriers?
- Did your relationship have a specific impact the interpretation of value of the work you presented to your formal counterpart? In other words, were you trusted enough by your formal counterpart, and by their extension the formal institution, to relay valuable and relevant data to them from your collaborations within the VTC?
- What do you find is the best way to establish static communication channels with formal organizations, both for immediate activation and future responses?
- What are your thoughts regarding the future VTC/Formal entity collaborations?
- How has your VTC changed from working with formal organizations? Has there been an effort to structure your VTC to be more interchangeable with the organizational framework of the formal agencies you work with? What are those efforts?

Questions Regarding goals and interface with V&TCs from the HRO's perspective.

- What is your organization and what is its role?
- What is your role within the organization?

- How does your organization approach information systems? In other words, are the protocols and process for collaborating, sharing or requesting information within agency or organization and between other institutions clearly defined?
- What is the prerequisite for collaborating with your agency?
- What was your perspective of VTCs before working with them?
- How does the connection happen between your formal organization and the virtual technical communities? Why do you work with VTCs? Who initiated the conversation/relationship?
- Are the institutional frameworks for collaboration with your organization compatible with working with a VTC? In other words, does your institution easily allow collaborative inductions of new VTCs or must that relationship be vetted and grandfathered through existing relationships?
- Are the needs of your organization clearly defined and disseminated to the VTC?
- Is there any kind of briefing or training given to partner VTCs regarding their role with your organization?
- Does your organization have a clear methodology to measure the contribution and impact of VTCs?
- How does one achieve a good workflow between formal organizations and VTCs?
- Do organizations clearly understand the implications of working with virtual “volunteers”?
- Are the coordinators with your organization permanent staff members or are they ad-hoc personnel (e.g. interns)?
- Is there a relationship retention protocol with your organization and the VTC? In other words, how are communication pathways retained for future crises?
- Is your organization a member of the VTC or influence its structure and governance in any formal or informal capacity?
- What data protection protocols does your organization exercise?
- Do you have thoughts on how to build sustainable relationships between VTCs and formal organizations?
- Did your relationship have a specific impact regarding the interpretation of value of the work that was presented to you from your counterpart in the VTC? In other words, did you trust your VTC contact, and by their extension the VTC, to relay valuable and relevant data to you? How is that data judged and transformed into physical actions by your organization (or corresponding organization if you are a coordinating entity).
- Is there a direct link between the acting field body conducting a physical humanitarian or crisis response and the VTC, or are all interactions and expectations filtered through ‘your’ coordination efforts? In other words, are you a middleman between the data that is generated and synthesized by the VTC, and dispatched to the field?

&

- Does your interpretation of the data impact its value?
- Were the needs of the VTC clearly defined? Did you have an accurate perception of their regarded role?

INTERVIEW PROTOCOL - Round 2

What is the risk of digital capacity derived data and prioritising useful information?

- How to define 'on a large scale' – which digital capacities are the most useful for deriving data about countries that have been affected by a disaster?
- What data formats are most commonly used?
- What is the minimum data specifications (time, context, people, format of collection) needed to generate accurate, realistic predictions for deploying resources?
- What are the general requirements of the end-user of the digital capacity?
- What is the minimum set of data required available?
- Is the data open or closed?
- Who owns the data?
- Are the data owners willing to share the data, and if not, what are the issues?
- Which arrangements with data providers should be realized in order to have them share the required data?

(Minimum threshold for risk) How should data be collected at the lowest possible-granular level?

- To what granular level should data be collected?
- To what extent can data that comes from or is available for only a limited number of communities or countries be extrapolated to neighbouring communities or countries?
- What are current best practices when it comes to data collection?
- What other data collection methodologies exist?
- What are the conditions, processes and policies necessary to carry out these methodologies, and which parties should be responsible for the data collection?
- What is the cost-effectiveness of these methodologies, in terms of cost and time vs. quality and accuracy?
- To what extent should data dynamics be considered? When are data changes significant enough to justify the updating effort?

How can the collected data be embedded and integrated into a problem-owner's decision-making process?

- Which actors are involved in humanitarian aid practices and decision-making processes?
- What do the planning, decision-making and coordination processes in which the toolbox predictions should be integrated look like?

- *How should the toolbox output be integrated in these processes in such a way that it leads to an increased speed and effectiveness of these processes?*

What kind of data is sought in disaster-onsets? The first 72 hours.

- What kind of information does your organisation need?
- Is this clearly and realistically defined?
- What do you seek to achieve (impact)?
- Is there a direct link between the acting field body (UN field office, e.g. I/NGOs) conducting a physical humanitarian or crisis response and your IM office?

What is the current state-of-the-art in digital tools and techniques needed in sudden onsets?

- What is the level of expertise needed for the IM products and services your organisation uses?
- What kind of state of the art is there regarding the sudden onset- 72-hour response?
 - In terms of IM?
 - Shared Situational Awareness (SSA)?
- Do you develop and maintain the tool(s) with in-house expertise (permanent staff) or do you outsource?
 - How does that affect the transmission of IM tasks to appropriate capacities?
 - Are there existing relationships with product developers outside the UN? Which?

How does one achieve a good “feedback loop” to inform the product creator on your needs and goals?

- Are you generally in touch with the product creator and able to provide specific instructions for what you need?
- What kind of feedback loop do you envision with the product creator?
- Were the needs of the product creator defined? Did you have an accurate perception of their role? Were you able to meet their needs?

Do you share any information tools with peer organizations?

- If yes: What is the tool and what why this tool for collecting information?
- What is the best strategy to learn about the information of your peer organizations and do you apply a retention strategy to do that? What kind of information sharing protocols do you practice?
- Does your organisation collaborate with other organizations with regards to IM, including sharing or requesting information, learning materials or tools?

Are the protocols and process for collaborating, sharing or requesting information, learning materials or tools within your org?

- What helped you to better share information with your counterparts (UN/non-UN)? What challenges did you overcome?
- Is there any kind of briefing or training given to a partner regarding sharing your information?
- How is the information received by other organizations, judged and transformed into physical actions by your organization?
- How do you perceive information as relevant/irrelevant?
- How is the quality of a data source determined?
- Do you also use secondary sources for information (i.e. Google, news, YouTube)?
- Does your organization have a clear methodology for measuring the contribution and impact of Web 2.0 tools? Do you regularly collaborate with technical capacities outside your organisation?
- Are the institutional frameworks for collaboration with your organization compatible with working with a non-U.N. HROs? In other words, does your institution easily allow collaborative inductions of other partners or contributors such as innovation enterprises or Virtual & Technical Communities? or must that relationship be vetted and grandfathered through existing relationships?
- Were other organizations available to share good practices or leverage innovative resources with you?
- What kind of experience do you have working with other humanitarian organizations? Which?
- Which organizations has your group collaborated with?
- What was the nature of that collaboration?
- How was this collaboration established? Do you have contact or reference point? Can you refer to a coordination network of some sort? Are there any other considerations I may have missed?
- What advice do you have for the development of information gathering tools for your organisation?
- What data security measures does your organization exercise?
- What data responsibility policies does your organization exercise?
- How do you classify information i.e. what are the parts you look for?
- Which visualizations are really helpful when displaying textual data?
- Does your organization have a clear idea on how information gathering tools should work in the future? If so, what would be the impact?

APPENDIX II - ANALYSIS AND CODING GUIDELINES

Step 1: Manual Content Review

The coding will be done based on the main codes and sub codes below and other relevant codes that emerge from the data. For instance, Institutional Design + IM Culture + Perception + Trust + Others. This involves reading the interview transcripts and accessed UNOCHA and DHN documents, one by one, carefully and line by line, identifying core themes and common references as the analysis of each item progresses. As the identification of core themes and common references is carried out, the researcher will index or “code” relevant words, phrases, sentences and sections, attributing labels to each piece of relevant information. These include the activities, actions, concepts, processes, opinions and perceptions found in the content of the interview transcripts and internal documents. Questions to take into account: ‘when, where, who, why, how, and with what consequences. In practice, write a summary for each interview (one A4, max 2), keeping in mind the research questions:

Research Question #1: What challenges manifest in the collaborations between Humanitarian Response Organizations and Virtual and Technical Communities?

Research Question #2: How do HROs and V&TCs structure their collaborations?

Research Question #3: How can HROs and V&TCs arrive at a governance framework for onboarding digital capacities?

These summaries include the following aspects: (i) the main themes and actors discussed, (ii) the main dilemmas and challenges that the participant encounters (as represented by the participant) and in relation to which actors; (iii) the responses to these challenges (strategies, responses, choices, actions) in relation to which actors; (iv) the consequences (results of actions) and for which actors; and (v) the proposed solutions for which actors from the participant and the researcher and quotes are added. At the end include a summary of the tentative answers to the research questions.

Step 2: Review Codes and Restructure

Once all of the document has been thoroughly reviewed, analyzed and coded, the researcher must review the collective materials and relate them to the code grouping them into categories based on their similarity to one another. New codes can be created from two or more existing codes, or they can also be reduced by folded one into the other if they are too similar. This step conceptualizes the data by reviewing the labelled content and determining the different abstracts of thought that are occurring in parallel to one another. For example, coded material dealing

with Information Management are intrinsically (but not always) linked to issues of Information Security and Risk. This in turn is linked to Organizational Structure and Policy. The former codes can be grouped into “Information Management” as a category while the latter codes deal more with “Governance”. These categories and their connections are the main results of the study. It is new knowledge regarding the IM environment of the participants of the study.

Step 3: Critical Interpretation of Key Terms

Following the analysis and coding procedure, the researcher will make an unbiased interpretation of the data content on the basis of these categories and their relation to one another. Color coding the key terms associated with the data helps to separate context-bound nuance and meaning. The chart below offers the sample of terms by which the coding, categorization and classification of the data was made during the analysis process:

Coding Reference

Governance	Collaboration	Information Management	Technical Expertise
Organizational structure	Community Resilience	IM product	Digital Capacity
Collaboration governance	Volunteer management	Sensemaking	Data Formatting
Bureaucracy	Coordination	Risk/ Information Security	Data Types
Standards	Exchanges	Coordination	Data Relevance
Protocols	Social credibility	Credibility	Context-Driven Data
Roles	Boundary spanning	Impact	Novelty Tech
Stakeholders	Interface	Information Security	Time/Geo Stamps
Politics	Independence	Compartmented Ops.	Reflexive Learning
Logistics Disruption	Grassroots design	Matchmaking	Expertise
Jurisdiction	Capacity retention	Outsourcing	Data Protectionism

Ad-hoc Operations	Sensemaking	Resource Management
Emergency Response	Technical Competence	Recruiting
Decision-making	Knowledge Creation	Local Language
Actors	Crisis Mapping	Local Customs/Culture
Problem owner	Crowdsourcing	Worker Security
Situational Awareness	Tacit Knowledge	Field Logistics
Deployments	Resilience Building	Contextual Information
In-Country/ on the Ground	ICT Support	Evidence-Based Reporting
Affected Communities	Peer-to-Peer Networks	Training & Awareness
Situational Awareness	Data Bias	Deployable Teams/Experts

Analysis Sample 1:

International Fed. Red Cross	Humanitarian organization	Maarten van der Veen- IMO	
Interviewer Question	Interviewee Response	Key Words	Analysis
“Do you normally stand apart from the of the UN cluster system when you conduct IM activities?”	“There are a lot of inter-cluster IM comms. happening during an onset. That coordination is handled in Geneva where they deal with the inter-cluster system. But there are plenty of places where we also we know what is being discussed (eg e-tools development)”	Information Management Coordination Roles	There is much inter-cluster communication and even sharing of projects and collaboration, however this is far from ideal as the coordination these are done on a face to face basis. For this, Red Cross differs from OCHA, as the latter is responsible for this kind of coordination.
“Have you ever needed to outsource parts of a project that you are working on to complete?”	“Yeah, we do more in-sourcing. It is not always easy to find someone if you require a lot of experience. There a lot of young people who have the technical capacity but maybe not the track record. That means they will be left out, maybe for good reasons.”	Technical Expertise Digital Capacity	For UN staff, the presence of ‘young’ technical capacities unfamiliar with UN processes creates tension and barriers to entry into their communication networks.
“Does the Red cross openly participate in collaborative work?”	“If you look at situational awareness as basically humanitarian intelligence, then they’re security implications that just can’t afford experimentation, not in the field where lives could be at stake.”	Disaster Response/ Incident Situational Awareness Decision-Making Field	The Red Cross adopts a ‘wait and see’ approach before taking steps to change what they do and how they do it. This may also be because of how they’re organized.

Analysis Sample 2:

Flowminder	V&TC-Expert network, software developer	Luis Capelo-Project Manager	
Interviewer Question	Interviewee Response	Key Words	Analysis
"Do you have direct communication with UN information clusters?"	"So very rarely, the client says 'I want you to do this, and we will pay you this'. It is more like, "we are reaching this new point of area of analysis and we know you guys are really good at it and we would like to do a project with you."	Information Management Outsourcing	Flowminder creates a good feedback loop by working closely together with UN staff on a financial level (fundraising), technical level (incorporate UN staff in projects) and executive level.
"Can you speak on the environment of digital capacities or other technical communities?"	"We are in the area of advanced analytics. It's a high expertise area, it is very difficult to staff. There is such a small market, all of them kind of have different strengths."	Technical Expertise Collaboration	This field (advanced analytics) is new and requires highly academic staff. Challenges would be training, costs etc. which limits the market for on demand resources.
"In your interactions with the UN, has there ever been an attempt to share one of your best practices and create a more robust collaborative environment?"	"Flowminder is a young organization, so if we haven't done this then it is because we didn't have the chance yet, not because we don't want it."	Governance	The novelty of advanced analytics has hindered cooperation so far. Sounds like there might be a potential, but collaboration does not seem realistic. Also depends on future developments.

APPENDIX III - CONSENT AND CONFIDENTIALITY AGREEMENT

It is understood that the project conducted by the researcher, John Phillip Sabou of the University of Leiden, Institute for Security & Global Affairs (ISGA), aims to record and share the perceptions, sensibilities, and recommendations of members connected to the information management culture within the United Nations Cluster System, and the Digital Humanitarian Network. The aim is to record the interviews of information managers, data scientists, and community specialists to promote a deeper understanding of effective IT governance where disaster management is concerned. Therefore, it is understood that the University of Leiden, at the discretion of the Rector, allows researchers to listen to the tapes and read the transcripts and use them in connection with their work or for educational purposes.

It is further understood that no portions of the tapes or transcripts may be used in other research except the current dissertation on any published form except by written permission of the Rector. It is understood that there are some risks, whether of a professional or other nature, for revealing the content of the interviews. In such exception, I reserve the right to remain anonymous if so agreed upon with the researcher. It is understood that Leiden University will use proper care in handling, storing, and using the interviews and any related material given to him in the course of the research. However, Leiden University shall not be liable for damages of any kind to the other party. It is understood that I freely volunteer myself for the interview and can withdraw from it at any point. Hereby, I agree with the terms of the interview and the confidentiality agreement.

Signature:

Date:

**Contact**

sabou@pef.czu.cz

Top Skills

Homeland Security
Emergency Management
National Security

Languages

English (Native or Bilingual)
Czech (Native or Bilingual)
Dutch (Limited Working)

RÉSUMÉ**John Sabou**

Lecturer at the Department of Information Technologies, Faculty of Economics and Management, CULS Prague
Prague Metropolitan Area

Summary

EXPERTISE: Disaster Management, Homeland Security, Information Management, Information Science Research, Intelligence Research, Project Management, IT Consulting, Higher Education.

ExperienceCzech University of Life Sciences Prague

- Lecturer, *Business Administration and Economics Management*, September 2018 - Present (3 years 2 months) Prague, The Capital, Czech Republic
- Lecturing courses in Information Systems and Information Communication Technologies.
- Developing grant proposals to Czech and EU government funding programmes.
- Principal researcher in the area of dis/mis-information in social media concerning the misuse of information technologies.

Self-Employed

Subject Matter Expert (Disaster Management)
May 2017 - September 2018 (1 year 5 months)
The Hague Area, Netherlands

- Managed and grew a client base with various research needs-oriented in data management and business analytics.
- Developed and implemented rigorous research strategies congruent with client needs (R&D in various settings).
- Responsible for the organization and analysis of raw data files and cross-tabulations using SPSS, Excel.
- Principal researcher: disaster resilience and crisis management strategies in business and government settings; with emphasis on internet technologies and mass communication.

Leiden University - Faculty of Governance and Global Affairs

Programme Coordinator, September 2016 - May 2017 (9 months) The Hague Area, Netherlands

- Responsible for the structuring of courses for the Global Affairs programme involving the design and implementation of curriculum goals including Crisis Management, Geoeconomics, Cyber-Security and Conflict Studies.
- Managed programmatic software (e.g., Blackboard, Sharepoint, etc.) and created infographic web-content.

Centre for Terrorism and Counterterrorism - Leiden University

Research Fellow, September 2013 - September 2016 (3 years 1 month) The Hague Area, Netherlands

- Led research and developed training materials and workshops employing analytical tools borrowed from systems thinking and ethnography.
- Coached and trained junior researchers and staff in the use of methodological tools including Participant Observation, Case Study Design, Social Network Analysis, Complex Systems Theory, et cetera.
- Produced and refined research tools and training materials for European Commission's FP7 project -- "Handbook on Networks in Innovation and Crisis Management: Theory and Practice in a Dynamic and Disruptive Environment".

United Nations Office for the Coordination of Humanitarian Affairs

Research Specialist (secondment), October 2015 - January 2016 (4 months) Geneva Area, Switzerland

- Assisted the program manager and the chief information officer of the Field Information Service (FIS) branch.
- Conducted research on the use of crowdsourcing in humanitarian logistics and relief activities.
- Delivered research findings and recommendations regarding the optimization of information management and data collection practices.
- Produced analytical briefs, infographics, and internal reports on country specific data.

Ricoh/Ken Blanchard Companies

On-Site Services Specialist, October 2012 - June 2013 (9 months) San Marcos, CA

- Managed records for work reports, inventories, and financial projections.
- Performed quality assurance on services and production equipment.
- Responsible for client support and distribution of document solutions.
- Responded to requests, queries, and conflicts from clients, team members and other employees with accuracy and in a professional, timely manner, and with tailored solutions.

San Diego State University

Research Assistant, November 2011 - May 2012 (7 months) San Diego, California

- Developed Java based mobile applications for radiation detection during Fukushima Daiichi incident, 2011.

- Assisted in the drafting of research proposals in collaboration with the University of Vietnam-Information Network & Infrastructure (INI)-development project.

The HALO Corporation

Intern/Public Information Officer, September 2010 - May 2011 (9 months) Greater San Diego Area

- Assisted in event planning and carried out fundraising for RSQ foundation, the non-profit arm of HALO.
- Coordinated group workflow and contributed to fundraising ideas and events.
- Participated in intense marketing and utilizing web-based social media for the Discovery Channel series "Kidnap and Rescue".

Education

Leiden University

PhD, Crisis/Emergency/Disaster Management · (2013 - 2017)

San Diego State University-California State University

MS, Homeland Security: Terrorism & Warfare studies · (2009 – 2011)

San Diego State University-California State University

BA, International Security & Conflict Resolution · (2007 - 2009)

