

# United for Humanity: Developing a Collaborative Model for Crowd Engagement in Crisis Recovery Campaigns

Maria Clara Pestana<sup>1</sup>, Vaninha Vieira<sup>1</sup>

<sup>1</sup>Instituto de Computação – Universidade Federal da Bahia  
(UFBA) – Salvador – BA – Brazil

{mpestanda, vaninha}@ufba.br

***Abstract.** The response to humanitarian crises involves unpredictable challenges faced by aid agencies. This research explores collaboration among entities and crowd engagement in the recovery of communities affected by crises and emergencies, focusing on the collaborative aspects of crowdfunding platforms. Crowdfunding has proven effective in rapidly raising funds, increasing public awareness, and identifying assistance needs during emergencies. This work proposes the analysis of a crowdfunding platform to enhance crowd engagement and collaboration between citizens and response entities in crisis recovery campaigns.*

## 1. Introduction

In 2022, the global Emergency Event Database EM-DAT [CRED 2022] documented 387 occurrences of natural hazards and disasters, leading to the death of 30,704 individuals and impacting the lives of 185 million people. Crisis communication technology can help to support this scenario and provide an efficient response to the population when an emergency appears. Collaborative platforms for crisis communication are still a research topic under investigation. It is known that nowadays there are difficulties related to establishing effective crisis communication. The problems are related to delays in responses, conflicting information, diverse public opinion, bad resource allocation, and geographical mapping issues.

Faced with the challenge of improving coordination and communication between crisis response agencies and the public, this research aims to explore crowd engagement and collaboration among entities in the recovery of communities affected by crises and emergencies. The specific focus is on the collaborative aspects of crowdfunding platforms, with the objective of assessing their potential in enhancing collaboration between response entities and citizens. This, in turn, contributes to improving communication and the overall effectiveness of efforts in crisis situations. A survey is applied to the crowdfunding public to gather valuable insights, emphasizing the importance of crowd engagement in shaping effective crisis recovery strategies.

In future work, data analysis methods will be applied using the records provided by crowdfunding platforms, allowing us to identify patterns and trends that will guide the development of an effective collaborative model.

## 2. Fundamental Concepts

The fundamental concepts explored in this article revolve around the field of humanitarian logistics, a critical component in disaster relief operations. This section provides a

comprehensive understanding of the key elements in humanitarian logistics, emphasizing the complex network of actors, challenges, and the critical role of funding systems.

## **2.1. Humanitarian Logistics**

Humanitarian logistics, as defined by Van Wassenhove [Van Wassenhove 2006], is the aspect that can make the difference between the success or failure of a disaster relief operation. It focuses on the efficient and cost-effective flow and storage of goods and materials, with a particular emphasis on organizing the acquisition, transportation, warehousing, tracking, tracing, customs clearance, and delivery of essential relief supplies and services during natural disasters. This logistical element is a linchpin in the chain of disaster response, acting as the backbone that can make or break the entire operation.

The Council of Supply Chain Management Professionals (CSCMP) [CSCMP 2023], formerly known as the Council of Logistics Management, defines logistics management as a segment of supply chain management that governs the streamlined, efficient movement and storage of goods, services, and pertinent information. This includes both forward and reverse flows, extending from the point of origin to the point of consumption.

Daud et al. [Daud et al. 2016] identify key aspects, including ensuring the appropriate delivery of goods, bulk commodities storage, staging, and movement, coordination and optimization of limited and shared transportation, managing people's movement, and ensuring specific deliveries from outside the affected area. Dolinskaya et al. [Dolinskaya et al. 2011] focus on the collaborative nature of logistical coordination in humanitarian aid management. They emphasize the importance of bringing together individuals with expertise, knowledge, and abilities in various disciplines from disaster-affected areas. Through collaborative joint efforts, they aim to reduce the suffering of affected people, underscoring the role of teamwork and collective expertise in the field of humanitarian logistics.

Kovacs and Spens [Kovács and Spens 2007] emphasize that the actor structure in humanitarian logistics is composed of stakeholders whose focus often lacks clear links to each other. The predominant actors in this structure include NGOs and government actors, forming a complex web of entities working towards common goals. The network of aid actors involved in humanitarian logistics, as defined by Kovacs and Spens, encompasses Aid Agencies, Donors, Governments, NGOs, Military, and Logistics Providers. These actors represent a diverse range of entities involved in the planning, coordination, and execution of disaster relief efforts.

One aspect highlighted by Kovacs and Spens [Kovács and Spens 2007] is that donors play a significant role in providing the majority of funding for large emergency aid activities. Donors contribute resources to aid agencies, including funding from various countries, support foundations, individual donors, and the private sector.

## **2.2. Challenges in Humanitarian Logistics**

Managing materials and resources during disaster situations, as outlined by Zago [Zago and de Lima Leandro 2013] is a complex challenge that involves critical aspects that must be carefully addressed to ensure the success and effectiveness of disaster response efforts. According to Zago [Zago and de Lima Leandro 2013], one of the initial

steps in disaster response is the accurate identification of the needs of affected communities. This requires a thorough assessment of conditions on the ground, including basic needs such as shelter, food, clean water, and medical assistance. The volume of donations in response to a disaster can be overwhelming, leading to issues related to waste and resource misallocation.

Efficient distribution of resources involves careful route planning, the selection of appropriate vehicles, and coordination among all stakeholders. Resource acquisition may involve donations that do not match the specific needs of the victims, necessitating clear communication regarding the required items and targeted donations. Financial resources often play a significant role in acquiring necessary materials. However, financial aid can be limited in situations where financial support is needed most [Zago and de Lima Leandro 2013].

The availability of adequate storage infrastructure can also pose a significant obstacle in disaster response. This includes the storage of materials and temporary accommodations for affected people, depending on the nature of the disaster. Effective coordination among all parties involved is essential to ensure that materials and information flow smoothly. Lack of coordination can lead to duplication of efforts and wasted resources. Damaged or destroyed local infrastructure complicates logistics operations, making it harder to access resources and personnel [Zago and de Lima Leandro 2013].

Human resources, including volunteers, play a valuable role in disaster response. However, it is crucial to ensure that volunteers receive proper training to ensure their contributions are effective. Impulsive and untrained actions can further strain available resources and potentially put more people in danger. The presence of volunteers is valuable, but it is essential to ensure that they receive proper training so that their contributions are effective. While humanitarian aid is noble, it is important to avoid impulsive and risky actions driven solely by emotion, which can put more people in danger [Zago and de Lima Leandro 2013].

### **2.3. Funding Systems**

Funding systems and financial flows are integral components of humanitarian disaster responses, significantly affecting the scope, speed, effectiveness, and efficiency of these responses [Wakolbinger and Toyasaki 2011]. These systems and financial structures are not often the focus of studies in humanitarian supply chains, yet they have become increasingly relevant in recent years due to the rising demand for disaster relief, competition for donations among similar agencies, and donor expectations regarding accountability, quality, and impact [Wakolbinger and Toyasaki 2011].

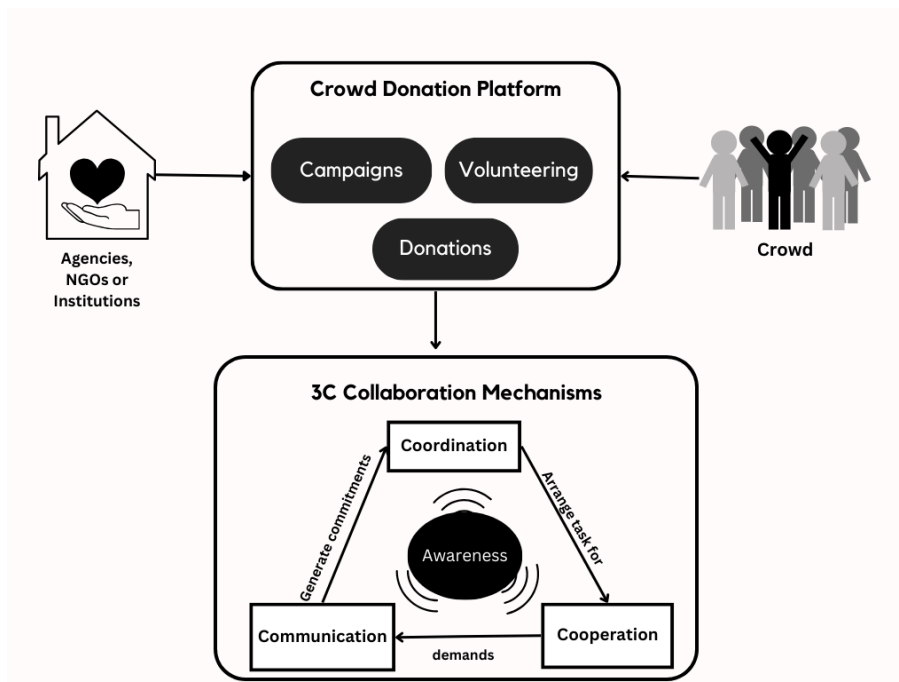
These funding systems encompass both official and private sources, shaping the allocation and disbursement of financial resources in humanitarian operations, operating in various phases of disaster response, including the Preparation Phase, Immediate Response Phase, and Reconstruction Phase, each with its specific objectives and challenges [Wakolbinger and Toyasaki 2011].

The Reconstruction Phase that follows a disaster involves allocating funds to long-term projects while considering need, impact, and cost-effectiveness. This phase requires a thorough assessment of the interaction between the reconstruction phase and the immediate response phase, especially in areas prone to frequent emergencies. Chal-

allenges in this phase include the shortage of funds due to donor apathy, the reallocation of funds if new emergencies arise, and the complexity of coordinating various agencies and funding streams for disaster relief and long-term development projects [Wakolbinger and Toyasaki 2011].

### 3. Proposal Overview

The actor-network theory, or ANT, proposed by French philosopher Bruno Latour [Latour 2005], posits that everything exists in a network of interactive relationships, encompassing people, technology, and non-living objects. Each actor in the network is considered equally important and is evaluated based on their interactions within the system. This research proposal associates the actor-network theory with the 3C model of collaboration [Fuks et al. 2008] to describe and regulate interactions within the network of recovery humanitarian aid entities, as illustrated in Figure 1. The actors involved in the proposed solution are the actors which include agencies, crowds, and the platform for humanitarian aid that interact collaboratively to facilitate crisis recovery, donations, and volunteering tasks.



**Figure 1. The diagram is based on ANT connections and illustrates the entities associated with the platform for humanitarian aid and the 3C Model for collaborative campaigns of donations, and volunteering.**

Communication provisions afford the public the means to reach out to institution representatives and facilitate internal communication networks for task execution teams. It is vital to facilitate crisis-related information sharing, requiring the disclosure of contact information and fostering internal networks among collaborators. Social media and chat features play significant roles in communication.

Cooperation involves support between organizations and the public, the public engages by contributing through voluntary tasks, monetary donations, or the provision

of material resources. In turn, these institutions reciprocate by furnishing assistance and disclosing information about the allocation of these resources. Cooperation mechanisms emphasize financial transparency, donations, and volunteer activities. The platform enables cooperation by providing a secure environment.

Coordination pertains to the platform's role in overseeing tasks, managing the allocation of resources and funds, and supervising recovery efforts. Coordination functionalities include tracking voluntary work, managing resources, and funds, and agencies can efficiently coordinate activities through task boards. The platform further aids in coordination through features like donation controls and task management.

## **4. Method**

Communities that were already in crisis before being struck by natural disasters become a priority for humanitarian assistance and usually receive donations that can improve their conditions. However, often these improvements are not sufficient, as these communities were already facing significant challenges. The management of donations can be complex, as there is often inadequate infrastructure to handle the large quantity of donations received. Studying this situation is crucial, as it shares similarities with the reality of some Brazilian communities facing critical conditions, and when they become a priority for assistance, they may encounter challenges in managing the resources received. How can we measure the real impact of a recovery solution on society and determine if it is effectively contributing to improving the conditions of the affected communities?

### **4.1. User Experience Method**

We based the research experiment on the User Experience (UX) theory. The focus of UX is not only the product, it includes the experiences and emotions that come into contact with them or are impacted by them. This is the perspective expressed in ISO 9241-210 (2019). ISO is an international organization for standardization, and this specific standard states that UX is a set of user perceptions and responses resulting from using a system, product, or service.

UX considers the scope of experiences we can have with digital technology and offers explanations and design principles drawn from philosophy, psychology, and cognitive sciences [Turner 2017]. This study aimed to comprehensively analyze user experience according to the descriptions on Table 1.

### **4.2. Survey**

Questionnaires were submitted to individuals from the general public in a survey format to obtain a comprehensive collection of information able to explain knowledge, attitudes, and behavior about crowdfunding users. Our survey follows the guideline based on [Pfleeger and Kitchenham 2001], which includes: setting specific, measurable objectives, planning and scheduling the survey, ensuring that appropriate resources are available, designing the survey, preparing the data collection instrument, validating the instrument, selecting participants, administering and scoring the instrument, analyzing the data and reporting the results.

The questions explore the use of established platforms for crisis recovery, such as crowdfunding, aiming to comprehend the user experience. From the perspective of

**Table 1. Analysis of User Experience Components on Crowdfunding Platforms**

#	Analysis	Description
1	Crowdfunding Platform Engagement	User interactions, ease of use, satisfaction with design and features; user-friendliness and accessibility.
2	Supporting Disaster-Affected Communities	User experiences aiding disaster-affected communities; motivations, emotions, and perceptions behind contributions.
3	Decision-Making Factors	Factors influencing user donation decisions; role of campaign authenticity, perceived impact of contributions.
4	Access to Information	User access to information on resource utilization and contribution impact; transparency in user experience.
5	Volunteer Participation	User engagement in volunteer efforts via crowdfunding platforms; motivations and volunteer experiences.
6	Challenges and Concerns	Study of user challenges and concerns; issues related to trust, security, accountability, and barriers to a positive experience.

campaign creators, we seek to understand issues related to donation receipt, communication for donation requests, how the requests are received, whether there is any financial accountability for monetary donations, how the resources are utilized, and how the seriousness of the work is demonstrated. On the contributors' side, the questions aim to delve into the challenges they face when attempting to make a donation and their contributions to projects and volunteer efforts dedicated to crisis management.

The survey was promoted on social media platforms such as Instagram and WhatsApp groups by the period of August 3rd and received responses until August 8th. The target audience was characterized as general users of these platforms since they have internet access and are familiar with crowdfunding platform content. The link for the question is: [https://drive.google.com/file/d/1bRa15WUi7\\_Kv3Kx0hzrcZU2BhH108KoI/view?usp=sharing](https://drive.google.com/file/d/1bRa15WUi7_Kv3Kx0hzrcZU2BhH108KoI/view?usp=sharing)

## 5. Preliminary Results

The survey revealed that among the 57 participants in the study, the most used platform was "Vaquinha Virtual", with 29 individuals, or 50% of the participants, reporting that they have made donations through this platform. The other platforms mentioned in the survey, such as Catarse, Kickante, Apoia-se, and Voaa.me, had less than 1% usage by the participants.

Our research showed that 40 people, or 70% of the participants, have used a crowdfunding platform to aid communities affected by emergencies and disasters, such as floods, earthquakes, or forest fires.

Analyzing the participants' responses regarding challenges or concerns when making monetary donations through crowdfunding platforms, we identified some trends in the concerns raised by the survey participants. To analyze these trends, we grouped keywords based on their frequency in the written responses. The counts indicate how

often these specific keywords appear in the text, highlighting the significance of these themes in the donors' concerns.

Participants expressed concern about the authenticity of campaigns created on crowdfunding platforms and the allocation of resources and accountability. The following keywords found in the texts illustrate this trend: translated keywords (count): authenticity (10), truly (11), destination (11), utilization (6), goal (5), used (3), directed (3), diverted (2), necessity (2), use (5), true (2), transparency (1), accountability (1), resource arrival (1), value arrival (1), return (1).

Participants also showed concerns about scams and security. It is noticeable that there is apprehension regarding trust in the institutions launching campaigns on crowdfunding platforms and their credibility. The following keywords found in the texts demonstrate this trend: translated keywords (count): scams (4), security (2), secure (1), data (2), apprehension (3), reliability (1), fake news (1), credibility (3), institutions (2).

Eleven participants (20%) revealed having organized donation campaigns through communication platforms. Among them, five people mentioned using WhatsApp to create and promote campaigns, four used social media platforms such as Instagram, and three used crowdfunding platforms such as Kickante and "Vaquinha Virtual".

Among the challenges faced in using crowdfunding platforms, participants reported difficulty in promoting, gaining visibility, and reaching a larger number of people. Another difficulty mentioned was the compensation of expected results and returns from the campaign. Some crowdfunding platforms either charge fees to withdraw the collected amount or have delayed disbursements.

The survey participants informed the decisive factors for making a donation. The items in Table 2 represent the percentage of participants who chose each reason as decisive for donating. The most significant reason was the Institution's reputation, followed by the Publishing financial report.

<b>Decisive Factor</b>	<b>Percentage</b>
Institution's reputation	67%
Publishing financial reports	61%
Importance of the recovery action to be taken	54%
Platform's reputation	47%
Donation cost	35%
Magnitude of the damage caused	33%
Being active on social media	16%

**Table 2. Decisive Factors in Donation Decision-Making**

On a scale of 1 to 5, about how necessary it is to have access to updated information about the use of donated resources and the impact of donations on communities affected by emergencies or disasters, 82% of participants rated it between 4-5 as necessary. On a scale of 1 to 5, about how necessary it is to have a communication channel with the humanitarian institution to which the donation will be made, 73% of participants rated it as 4-5 necessary.

Eighty-six percent (86%) of respondents indicated they would like to be notified

about the need for donation materials at collection points. The most donated items by people are clothing, hygiene materials, and non-perishable food. The most attractive volunteer tasks for participants are selecting donation materials and storing the collected donations. Two participants stated they could do any necessary work, while nine participants (16%) declared no interest in volunteer work.

## **6. Discussion**

Concerns in crowdfunding projects include challenges in promoting campaigns and gaining visibility, as well as issues with fee charges and payment delays. Donors express worries about campaign authenticity and resource allocation, posing difficulties in supporting disaster-affected communities. Key factors influencing donation decisions include the institution's reputation and the publication of accountability reports. Users emphasize the importance of access to updated reports on resource usage and donation impacts on affected communities. The need for a communication channel with the receiving humanitarian institution is highlighted for disseminating notifications about donation material needs and commonly donated items.

The study identifies insights to refine the proposed crowd engagement model for crisis recovery campaigns. The 3C model emerges as particularly relevant. Concerns about campaign authenticity underscore the need for transparent mechanisms, aligning with the principles of Cooperation and Coordination among stakeholders in crowdfunding for disaster-affected communities. Decisive donation factors, such as the institution's reputation and financial reporting, provide insights to bolster public trust, emphasizing the importance of effective Communication in the 3C model. The demand for real-time information on resource utilization further emphasizes the model's need for transparent communication of donation impacts, aligning with the Communication aspect of the 3C model. The emphasis on effective communication channels suggests integrating tools for continuous stakeholder interaction, reinforcing the Communication and Coordination components of the 3C model. Participant challenges in promoting campaigns signal the model's need for strategies to overcome obstacles, potentially incorporating features for enhanced campaign promotion effectiveness while aligning with the principles of Coordination and Communication in the 3C model.

## **7. Conclusion**

The present research highlights the application of collaboration for crowd engagement in crisis and disaster situations. Crowdfunding platforms were chosen as the object of study since these platforms allow the public to actively participate in recovery campaigns during times of crisis, such as natural disasters.

Based on the findings of the study, the main conclusion is that the development of the proposed model for crowd engagement in humanitarian crisis recovery campaigns should prioritize addressing specific challenges identified by the Survey participants. These challenges include the effective promotion of campaigns, gaining visibility, ensuring the authenticity of campaigns, and the need for transparency in the utilization of donated resources. Additionally, public trust is crucial and influenced by the reputation of the benefiting institution, transparent financial reports, and accountability mechanisms.

In future work, the insights provided by this research will be used to analyze



open data from crowdfunding platforms for the rehabilitation of communities affected by disasters and emergencies. This analysis will aid in the development of an effective collaborative model aimed at improving responses to crises and disasters, actively involving the community and humanitarian institutions. As a contribution, this model has the potential to enhance coordination and communication during crises, benefiting affected communities and promoting more effective support in times of need.

## 8. Acknowledgement

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