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Article

Network Structure in Disaster Response: The Mediating Role of Coordination Within a Humanitarian Organizational Network in Uganda

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ABSTRACT

There is limited academic endeavour to study the mediating role of coordination in the relationship between network structure and disaster response in the context of humanitarian organisations. Furthermore, much of the research focuses on identifying challenges rather than offering deeper insights about this study. Moreover, most disaster management research centres on Western countries with well-established response systems and planned coordination. This overlooks the unique realities of less developed countries, such as Uganda, where humanitarian contexts are more complex and response systems are less organised. The study employed a cross-sectional survey design, utilising quantitative methods. A survey was conducted using questionnaires administered to seventy (70) humanitarian organisations, particularly those that participated in the three (3) Ugandan disasters highlighted in this study. Findings suggest that the structure of the humanitarian organisational network impacts disaster response, and coordination mediates the relationship between network structure and disaster response. The study concludes that disaster response is dependent on a well-structured humanitarian organisational network, and without coordination, disaster response efforts are likely to be ineffective. This study further provides both theoretical and practical implications, especially for disaster scholars and practitioners in developing countries.

KEYWORDS

Risk; humanitarian; network structure; coordination; disaster response.

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1. Introduction

Research on humanitarian organisational networks has gained significant attention in recent years (Stephenson, 20004). However, much of this research focuses on disaster impacts, risk management, and post-disaster recovery — leaving the critical area of disaster response and the role of coordination underexplored (Xue et al., 2023; Ruesch et al., 2022). Scholars argue that effective coordination among humanitarian organisations leads to more effective disaster response outcomes (Krishnan & Winter, 2009; Stephenson, 2005). In contrast, the absence of a central authority and poor coordination among humanitarian actors often results in ineffective response efforts (Shah et al., 2018; Negi, 2022). Despite the extensive literature on the impact of humanitarian networks on disaster response, a clear framework to explain how coordination influences this relationship remains elusive (Bertazzo et al., 2018; Wagner et al., 2024).

The rising frequency of both natural and human-made disasters further emphasises the need for effective disaster response to reduce suffering among affected communities (Wankmüller & Reiner, 2020). Disasters are often unpredictable and complex, involving a wide range of humanitarian organisations (Molnar, 2024; Sudar et al., 2024; Jovicic et al., 2024). This complexity demands stronger coordination to ensure a more effective response (Wankmüller & Reiner, 2020). Without coordination, overlapping efforts, resource wastage, and delayed responses are more likely to worsen the already dire conditions for those impacted (Tatham et al., 2017; Amatya & Khan, 2023).

Disaster response involves a wide range of actions aimed at restoring normalcy as quickly as possible (Rahman et al., 2022). However, given the chaotic and challenging nature of disaster environments, coordination is crucial to streamline the efforts of governments, humanitarian agencies, and other stakeholders (Chatterjee et al., 2010; Hu, 2022). Studies suggest that good coordination in post-disaster settings improves response efforts (Shah et al., 2022). Unfortunately, even with various strategies in place, large-scale disaster response remains a challenge (Waugh & Streib, 2006). Uganda faces a similar reality, with over 200,000 people affected by various disasters annually (World Bank, 2010). Recent disasters include the August 2022 floods in the Elgon sub-region, landslides in Kasese and Bundibugyo, the 2019 Karamoja locust invasion, the COVID-19 pandemic, and the 2021 Ebola outbreak in Mubende district. These events had a profound impact on communities and strained national response systems. In May 2013, floods in Kasese, the worst since 1976, claimed eight lives and displaced over 25,000 people when the River Nyamwamba burst its banks (DREF, 2013). Similarly, the 2010 Bududa landslides killed over 120 people, destroyed more than 500 homes and affected entire villages (WHO, 2010; DREF, 2012; Gorokhovich et al., 2013). The 2007 floods in the Teso sub-region affected 25 districts, prompting a $20 million emergency relief appeal and a declaration of a state of emergency.

These large-scale disasters drew extensive humanitarian response efforts involving numerous organisations providing search and rescue, medical aid, evacuation, and logistical support (Gorokhovich et al., 2013). However, response efforts were marred by poor coordination, role duplication, information asymmetry, logistical breakdowns, and infrastructural constraints (Doocy et al., 2013; Daily Monitor, 2021; Negi, 2022).

This study aims to answer three research questions specifically: a) Does a good Network Structure Improve Disaster Response? b) Does a well-structured Network Improve Coordination? and c) Does Coordination Mediate the Relationship between Network Structure and Disaster? To address these questions, three hypotheses have been formulated (Hypothesis 1: A Good Network Structure Improves Disaster Response; Hypothesis 2: A Well-Structured Network Improves Coordination; Hypothesis 3: Coordination Mediates the Relationship between Network Structure and Disaster). Therefore, this study aims to investigate the mediating effect of coordination on the relationship between network structure and disaster response in Uganda, providing insights that may contribute to more effective response strategies in similar contexts.

2. Literature Review

The increasing frequency and intensity of disasters over the past three decades have spurred growing academic interest in disaster and risk studies (Safarpour et al., 2020). It is estimated that since 2010, over 200 million people annually have been affected by various disasters worldwide (Sapir, 2011; CRED, 2022; Pilorz, 2023). The United Nations Climate & Environment Report (2021) projects that by 2030, half of the world's population will be exposed to natural disasters. These disasters, whether natural, artificial, or hybrid, are characterised by the large-scale destruction of infrastructure, loss of life and property, economic setbacks, and disruption of societal functions (Botzen, 2019; Das, 2023).

Recent global disasters, including the Israel-Palestine conflict, the Russia-Ukraine war, Hurricane Ian (2022), the Hong Kong floods (2023), the Gulf oil spill, the Japanese nuclear reactor leak, Hurricane Katrina (2005), Typhoon Haiyan in the Philippines (2013), and earthquakes in Haiti, Turkey, Syria, and Morocco, underscore the complexity of disaster response operations (Mohibbullah, 2021). These events involve numerous humanitarian organisations, resulting in intricate networks and coordination challenges. For example, the 2000 Mozambique floods mobilised 49 countries and over 30 international non-governmental organisations; however, response efforts were mainly deemed ineffective due to coordination failures (Moore et al., 2015).

In recent years, inter-organisational collaborations have emerged as a crucial area of research in disaster management, focusing on partnerships, alliances, and networks among humanitarian actors (Bisri, 2016; Nolte, 2018). A key theme within this body of work is the concept of "humanitarian organisational networks" defined by structures, relationships, and preparedness which influence how organisations interact and ultimately affect disaster response outcomes (Kapucu, 2010; Mutebi et al., 2020; Popp et al., 2014; Kaat & Verkey, 2022).

Disaster response is regarded as the cornerstone of disaster management, emphasising the protection of human lives and the rapid restoration of essential services (Basset et al., 2020). Herrmann (2007) describes disaster response as the orchestration of all activities aimed at mitigating the immediate effects of a disaster, including rescue operations, provision of emergency aid, infrastructure restoration, and fulfilment of basic human needs (Warfield, 2012; Phillips & Mincin, 2023). Effective disaster response requires coordinated efforts characterised by robust communication systems, efficient resource and logistics management, and specialised expertise (Wassenhove, 2006; Hayes et al., 2022).

According to Lee (2000) and Arshinder et al. (2008), coordination is a tool that facilitates the management of workflow and resources among chain members, thereby improving performance in terms of faster and more efficient response times. Balcik (2009) asserts that for coordination to occur, four key aspects must be considered: stakeholder coordination, logistics coordination, resource management, and information management.

Coordination serves as the critical link between humanitarian organisational networks and disaster response, facilitating logistics, information flow, resource management, and collaboration among actors (Tosi & Marty, 2024). Effective coordination mitigates field-level inefficiencies and ensures responders and victims alike benefit from streamlined interventions (Advanced Training on Humanitarian Action, 2008). Given the diverse perspectives and priorities among humanitarian actors, vertical and horizontal coordination becomes imperative to foster information sharing, improve assessment accuracy, enhance public confidence, and ensure overall safety and stability (Kovács & Spens, 2007; Balcik et al., 2010; Kapucu, 2022).

Humanitarian organisational networks are especially vital in complex, multi-stakeholder disaster scenarios (Kovács, 2020). In such dynamic environments, both formal and informal relationships emerge to address shared concerns, with the overarching goal of achieving efficient and effective response operations (Lassa, 2011). The primary objective remains delivering timely, needs-based assistance to affected populations, which requires a unified control mechanism driven by effective coordination (Zhao et al., 2009).

2.1 Network structure

According to Pasquero (1991), "network structure" refers to the elements that comprise the administrative mechanisms by which the network operates. Pasquero (1991) further contends that these elements are network ties, network size and density and network centrality. The strengths and weaknesses of the ties are determined by the interaction that organisations within a network have with each other (Burt, 1997; McEvily & Zaheer, 1999). According to Burt (1997) and Gulati and Singh (1998), strong ties reduce coordination costs through trust and cooperation, while weak ties facilitate the provision of information and control benefits within the network. Strong ties also help organisations access critical resources at the dyadic level, which is essential for network survival, unlike the case. Similarly, according to Burt (1997), network size refers to the actual number of network members or actors. The higher the number of actors, the higher the density. According to Wegberg (2003), Network density indicates the proportion of possible links between firms that are formed. He further says that a dense network will tend to quickly spread information faster compared to a network that is not dense and that a dense network provides a control variable that reduces manipulation, superiority, and unethical behaviour and increases trust (Brass et al., 1998; Hite & Hesterly, 2001; Burt, 1997). On the other hand, Network centrality refers to the degree to which an organisation holds a strategically important position within the network (Freeman, 1979). Being central in a network provides a focal organisation with various information advantages (in the form of access, timing, and referrals), control benefits (i.e., power), and learning opportunities (Gulati, 1998).

A network structure in a humanitarian organisational setting is formed naturally through adaptation to the network environment or disaster scenario. Without a structure, the organisational network cannot serve its purpose. For example, Agung (2022) asserts that without a formal network structure, a network is considered not "serious." According to Wegberg (2003), the structure of organisational networks determines which organisation has the best access to information and under what conditions. When a disaster occurs, there is great chaos as victims try to find ways to survive. This is coupled with the large number of relief organisations that descend on the affected area, creating a complex scenario (Olafsson, 2012).

2.2 Network Structure and Coordination

A well-structured network facilitates more effective coordination during disaster response. It leads to "economic efficiencies, greater service quality, organisational learning, access to new skills, diffusion of risk, improved public accountability, ability to buffer external uncertainties, and conflict avoidance." (Brudney, 2007). Because coordination among humanitarian organisations is complex, a relatively well-structured network is a prerequisite, as each organisation has different processes. According to Bots and Sol (1988), there are three perspectives on coordination: the micro-perspective, coordination among individuals; the intermediate perspective, coordination between two organisations; and the macro-perspective, inter-organisational coordination.

Tomasini and Van Wassenhove (2006) assert that the coordination of humanitarian efforts is based on the three principles of humanity, neutrality, and impartiality and that any violation of these principles will result in untold suffering. The primary objective of coordination in a humanitarian relief context is to respond effectively and efficiently to disasters, whether artificial or natural, in order to restore order (Akhter et al., 2012). Balcik (2009) says that there is always an "inherent chaotic post-disaster relief environment which attracts a large number of organisations ranging from the host governments, the military, local and regional relief organisations to private sector companies, each of which has different interests, mandates, capacity, and logistics expertise". For example, the 2004 Asian Tsunami drew the attention of over 40 countries and 700 non-governmental organisations (Balcik, 2010). Such large numbers of responders may present a coordination challenge if the responding organisations are not well-structured.

At the centre of coordination lies information sharing, which is a crucial factor in coordinating disaster response operations. Information sharing in disaster management is a valuable tool for de-

livering timely information and reducing uncertainty (Hovhanessian, 2012). It also reduces costs associated with response operations and enhances services related to response operations (Dolinskaya et al., 2011). However, Russell (2005) asserts that information regarding all humanitarian response efforts is often incomplete or mostly unreliable because aid operations are unstructured and coordination practices are deficient within the responding organisations.

Therefore, coordinating crisis and disaster response operations is a complex and challenging task due to the large number of organisations involved. Coordination ensures that there is shared risk and responsibility for assessing and responding to a disaster (Comfort, 1999; Kapucu & Comfort, 2002). Coordination in disaster response primarily involves recruiting and paying workers, managing volunteers and staff, information, communication, funds, and accounts, as well as building relationships with partners in both governmental and non-governmental sectors (Akhtar et al., 2012). Literature also suggests that coordination failures are always present among humanitarian organisations, as evidenced during the responses to the 2004 Indian Ocean Tsunami, Hurricane Katrina in 2005, and the 2010 Haiti earthquake. (Samii and Van Wassenhove 2003) (Van Wassenhove , 2006).

Scholars, therefore, contend that any form of coordination is based on networks. However, empirical studies also point out that "it is difficult, if not impossible, to draw causal inferences about the effect of network structure on coordination" because networks are complex and, as such, vary in network structure (McCubbins, Paturi and Weller 2015). This, therefore, makes coordination a complex event as well (McCubbins, Paturi, and Weller, 2015).

From the above, the nature of the disaster determines the mix of humanitarian organisational network players and their relative importance or power (Nolte, 2015). Where there is much chaos, organisations are left to establish their social order, often within hierarchical or centralised structures (Nolte et al., 2012). According to Brown and Robinson (2005), the overall effectiveness of a disaster response operation is difficult to measure because every disaster is unique. Therefore, the response is different at both the inter-organisational and household levels. Furthermore, similar disaster events yield vastly different results in their aftermath, which also influences the number of responding organisations.

2.3 The mediating effect of Coordination

According to Chatterjee (2010), the high costs of human lives, property damage, and economic devastation brought about by natural disasters over the past two decades have spurred governments and humanitarian institutions to take several important measures to strengthen their disaster management systems. Maires (2005) states that within the last decade, organisations have increasingly recognised the value of having a coordinated response to humanitarian emergencies. For example, in 1991, the United Nations established the Office for the Coordination of Humanitarian Affairs (OCHA) with the primary objective of facilitating coordination among the various UN bodies responding to humanitarian emergencies. Reviews of post-disaster scenarios and other complex humanitarian emergencies highlight that a lack of coordinated responses is a significant limitation to the overall effectiveness of disaster response (Kettl, 2003; Kapucu, 2006; Comfort, 2007). To improve the flow of resources among agencies and increase the accountability and effectiveness of disaster response operations, Stephens (2005) and Moore et al. (2003) suggest that The ever-increasing number of humanitarian aid organisations, the wide range of resources, and the complexity of disasters have made coordination a rather challenging exercise (Rey, 1999). A coordinated disaster response facilitates a high-quality humanitarian response by providing a platform for partnerships among key actors (Chatterjee, 2010).

Scholars like Moore et al. (2003) assert that the success of humanitarian aid operations depends on the ability of organisations to work together through sharing information, stakeholder partnerships, expertise, and, above all, logistical coordination. For example, through Logistical coordination, it is easy to make an inventory of the available aid, identify the type of aid needed, and determine the quantities, including storage and distribution. On the other hand, stakeholder coordination ensures that stakeholder partnerships are in place, which enable aid to be distributed effectively and

equitably, thereby avoiding the violation of the fundamental humanitarian principle of impartiality. Establishing relationships during non-disaster times will help in this process. Additionally, through coordination, information sharing occurs, and information is crucial as it serves as a means of building trust between the affected communities and civil society organisations. Trust-building is crucial for NGOs and affected communities.

The importance of coordination in effective disaster response has been highlighted by many analysts and scholars (McEntire, 2004; Minear, 2002). In emergencies, coordination aims to reduce duplication of roles among humanitarian organisations involved in the response efforts (McEntire, 2015). This is further highlighted by the Hurricane Katrina disaster, which attracted over 500 actors. According to Zhao et al. (2010), coordination among humanitarian organisations during the response stage leads to the attainment of both short-term and long-term organisational goals.

However, disasters are inherently chaotic, making coordination exceedingly difficult when each organisation operates independently (Boersma, 2014; Malesic, 2020). Despite the growing literature on humanitarian networks and disaster response, a notable gap remains: the mediating role of coordination between network structures and disaster response is insufficiently studied (Rouhollah et al., 2018). Existing research often focuses on Western contexts with established disaster preparedness systems, overlooking the unique challenges faced by developing countries, such as Uganda (Mena et al., 2022; Abunyewah, 2023).

To guide our study, the following hypotheses are developed from the above literature;

Hypothesis 1: *A Good Network Structure Improves Disaster Response.*

Hypothesis 2: *A Well-Structured Network Improves Coordination*

Hypothesis 3: *Coordination Mediates the Relationship between Network Structure and Disaster Response*

3. Methodology

The study employed a cross-sectional survey design, utilising quantitative methods. A survey was carried out using questionnaires. The study population consisted of 86 organisations that participated in the response operations for the three disaster scenarios (Office of the Prime Minister [OPM]; URCS Kasese Operations Report, May 2013; ACT Alliance Preliminary Appeal UGA131; URCS, August 2010 Bududa Landslides Operations Report; Domestic Humanitarian Response Uganda Report, 2008). Using the Krejcie & Morgan (1970) table for determining sample size, a sample of 70 humanitarian organisations was selected. To ensure a representative sample, a stratified sampling design was employed, as recommended by Thomas (2020). The organisations were stratified into five categories based on their area of specialisation: Medical/Sanitation, Food Supplies, Shelter/Reconstruction, Security, and General Aid/Relief Supplies. Six respondents with direct knowledge of the response operations during the three disaster scenarios were purposively selected from each organisation, resulting in a total of 420 respondents. Data collected from the selected 70 humanitarian organisations were entered into the Statistical Package for the Social Sciences (SPSS, Version 21.0) for analysis. Correlation analysis was employed to investigate the relationship between variables, and regression analysis was utilised to assess the predictive power of the independent variable on the dependent variable. Structural Equation Modelling (SEM) was performed using AMOS, and a bootstrap methodology was employed for the mediation analysis.

3.1 Measurement of Variables

The measures were derived from the literature. Specifically, the Network structure was measured in terms of Network Ties, Network size, density, and Network centrality. Coordination was measured in terms of logistical coordination and resource management, stakeholder coordination, and information management. Disaster response was measured in terms of saving lives and property, response time, assessment accuracy, information dissemination, public confidence, and safety and stability.

4. Results

Confirmatory factor analysis was conducted in AMOS software in order to derive the measurement model for the variables, and the tables below show the fit indices

Table 1. Model Fit Summary for Network Structure

χ^2	DF	P	χ^2/DF	GFI	AGFI	NFI	RFI	IF	TAG	CFI	RMSEA
1.972	1	.160	1.972	.996	.963	.995	.969	.997	.985	.997	.061
				Estimate		S.E.	C.R.	P	Beta	AVE	R^2
NSD1	<---	NSD		1.000					.838	0.889	.245
NSD2	<---	NSD		1.088		.164	6.626	***	.848		
NC4	<---	NC		1.000					.499		
NC5	<---	NC		2.777		1.220	2.275	.023	1.372		

Source: Primary Data

The initial measurement of network structure included three constructs—Network Ties, Network Size and Density, and Network Centrality—each with five items. However, a confirmatory factor analysis (CFA) in AMOS resulted in the retention of only two constructs, as shown in Figure 7, to improve model fit. The model statistics, including a Chi-square value of $\chi^2 = 1.972$, degrees of freedom (DF) = 1, and p-value = .160, indicate that the data did not differ significantly from the model. The M2/DF = 1.972 suggests an adequate model fit. Additionally, the fitness indices (GFI, AGFI, NFI, RFI, IFI, TLI, CFI) were all above 0.90, indicating a good model fit. The RMSEA of 0.061, which is below the threshold of 0.08, further supports the model's adequacy. Convergent validity was confirmed with an Average Variance Extracted (AVE) of 0.889, above the required minimum of 0.5, and discriminant validity was established with an (R^2=.245), which is below the AVE. These results collectively affirm that the model is both valid and well-fitted.

Table 2. Model fit summary for Coordination

χ^2	DF	P	χ^2/DF	**GFI**	**AGFI**	**NFI**	**RFI**	**IF**	**TAG**	**CFI**	**RMSEA**
13.811	8	.087	1.726	.983	.956	.984	.970	.993	.987	.993	.052
				Estimate		S.E.	C.R.	P	**Beta**	**AVE**	**R^2**
VHC1	<---	VHC		1.000					.893	0.694	.091
VHC2	<---	VHC		1.035		.051	20.251	***	.965		
VHC3	<---	VHC		.780		.055	14.166	***	.712		
IM2	<---	I'M		1.000					.701		
IM3	<---	I'M		1.479		.139	10.679	***	.992		
IM4	<---	I'M		1.111		.104	10.724	***	.670		

Source: Primary data

Coordination was initially measured using three constructs: Logistics and Resources Coordination, Stakeholder Coordination (VHC), and Information Management (IM). However, after conducting a confirmatory factor analysis (CFA) with AMOS, only two constructs were retained, as shown in Figure 10. The model fit statistics indicated an adequate fit to the data, with a X^2 value of 13.811, 8 degrees of freedom (DF), and a p-value of P = .087. The ratio of χ^2/DF = 1.726 was within the acceptable range, suggesting that the data did not significantly differ from the model (Kline, 2016). Additionally, all retained observed variables significantly measured the corresponding latent constructs (P < .05), confirming their relevance.

The fitness indices, Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Normed Fit Index (NFI), Relative Fit Index (RFI), Incremental Fit Index (IFI), Tucker-Lewis Index (TLI), and Comparative Fit Index (CFI) all exceeded the threshold of 0.9, further supporting the model's adequacy (Hu & Bentler, 1999). Moreover, the Root Mean Square Error of Approximation (RMSEA) of 0.052, which is below the maximum acceptable threshold of 0.08, confirmed the model's good fit

(Browne & Cudeck, 1993). Convergent validity was established, with an Average Variance Extracted (AVE) of 0.694, which is well above the required threshold of 0.5 (Fornell & Larcker, 1981). Discriminant validity was also achieved, as the squared correlation coefficient ($R^2 = 0.091$) was below the average variance extracted (AVE), indicating that the constructs were distinct from each other (Hair et al., 2010).

Table 21: Model fit summary for Disaster Response

χ^2	DF	P	χ^2/DF	GFI	AGFI	NFI	RFI	IF	TAG	CFI	RMSEA
34.843	6	.000	5.807	.959	.856	.945	.862	.954	.883	.953	.135
				Estimate	S.E.	C.R.	P		Beta	AVE	R^2
PC2	<---	PC		1.000					.784	0.638	0.579
PC3	<---	PC		1.261	.109	11.541	***		.903		
SS1	<---	SS		1.000					.716		
SS2	<---	SS		.930	.130	7.128	***		.676		
TR1	<---	TR		1.000					.801		
TR2	<---	TR		1.190	.119	9.968	***		.887		

Source: Primary Data

Disaster Response was initially measured by six constructs: Saved Lives and Property (SLP), Timely Response (TR), Assessment Accuracy (AA), Information Dissemination (ID), Safety and Stability (SS), and Overall Effectiveness (OE). After confirmatory factor analysis (CFA) using AMOS, only two constructs were retained, as shown in Figure 11. The model fit statistics revealed a significant deviation from the data, with $\chi^2 = 34.843$, df = 6, and p = .000, indicating a poor fit (χ^2/df = 5.807). However, the retained variables significantly measured the latent constructs (P < .05). Fitness indices, such as GFI, AGFI, NFI, RFI, IFI, TLI, and CFI, were above 0.9, suggesting an acceptable model fit; however, the RMSEA value of 0.135 indicated a moderate fit. Convergent validity was confirmed with an AVE of 0.638, above the threshold of 0.5, while discriminant validity was supported by the squared correlation coefficient ($R^2 = 0.579$), which was below the AVE.

4.1 Correlation results

Pearson Correlation coefficients were used to analyse the relationships between study variables. Table 1 presents the results.

Table 1: Correlation results

	1	2	3
Network Structure (1)	1		
Disaster Response (2)	.618**	1	
Coordination (3)	.478**		1

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Primary data

Results in Table 1 indicate a significant positive relationship between network structure and Disaster Response (r = .618**) and a significant positive relationship between Coordination and Disaster Response (r = .458**).

4.2. Regression results

The hierarchical regression analysis method was used to examine the influence of Network Structure on Disaster response and the influence of Network structure on Coordination. Table 2 presents the results.

Table 2: Regression results

	Model 1		Model 2	
Variable	**B**	**Beta**	**B**	**Beta**
(Constant)	1.785***		1.574***	
Network Structure	.564***	.618***	.559***	.418***
Coordination				
R	.618		.478	
R2	.382		.229	
Adj. R2	.380		.226	
R2 Change	.382		.229	
F Change	162.837		78.041	
Sig. F	.000		.000	
F	162.837		78.041	
Sig.	.000		.000	

Source: *Primary data*

Results in Table 2, Model 1, show that the Network structure significantly predicts Disaster Response (Beta = .618 ***). The network structure predicts approximately 38% (Adj. $R^2 = 0.38$) of Disaster Response. Overall, Model 1 is significant (Sig. = .000), implying that Hypothesis 1, which states that A Well-Structured Network Improves disaster response, is supported.

Results in Table 2, Model 2, show that the Network structure significantly predicts Coordination (Beta = .478 ***). The network structure predicts approximately 23% (Adj. $R^2 = .226$) of Coordination. Overall, model 2 is significant (Sig. = .000), implying that Hypothesis 2 *states that Good Network Structure coordination* is supported.

4.3. Mediation effect of coordination in the relationship between Network structure and disaster response

According to statistical literature, once relationships are established among variables, there is a need to determine if the mediation effect is statistically significant. To achieve this, there are two primary methods: i.e. the Sobel test (Sobel, 1982) and bootstrapping (Preacher & Hayes, 2004). In this study, we used the Bootstrapping method to test mediation hypotheses by establishing direct and indirect mediation effects. Table 33 presents mediation results.

Table 3. Bootstrap Mediation effects

Dependent variable		Mediating variable		Independent variable	DE	P	IE	P	Mediation effect	Hypothesis
Disaster Response	<---	Coordination	<---	Network structure	.122	.010	.013	.010	Partial mediation	H3

Source: Primary Data

Hypothesis 3: *Coordination mediates the relationship between Network Structure and Disaster Response.*

The results show that both the direct and indirect effects of network structure on disaster response are significant (direct effect: Beta = .122, p = .010; indirect effect through coordination: Beta = .013, p = .010), meaning that how a network is organised or structured plays an important role in shaping how well humanitarian organisations respond to disasters. At the same time, coordination also plays a crucial role in this relationship, serving as a partial bridge between the network structure and disaster response. This means that while a well-structured network directly improves disaster response, it also does so indirectly by facilitating easier coordination among organisations. The

support for H3 confirms that coordination partially explains how a strong network structure leads to better disaster outcomes. For humanitarian organisations in Uganda, this highlights the importance of not only building clear and organised networks but also actively promoting coordination within those networks to enhance overall disaster response efforts.

5. Discussion

The study sought to establish the relationship between network structure, coordination, and disaster response, with three primary hypotheses. The results indicated significant and positive relationships among network structure, coordination, network structure and disaster response, and coordination and disaster response. These findings support the notion that improving the quality and organisation of network structures enhances coordination and, in turn, improves disaster response outcomes. These results align with the existing literature, which emphasises the importance of well-structured networks in fostering coordination during disaster responses. According to Brudney (2007), effective network structures lead to economic efficiencies, improved service quality, organisational learning, and risk diffusion—all of which contribute to more effective disaster response.

The results support all three hypotheses, leading to the conclusion that a well-structured humanitarian organisational network enhances coordination during disaster response efforts. When organisations coordinate effectively, they can avoid conflicts and competing interests, which is crucial for efficient disaster response.

Coordination plays a central role in enhancing disaster response, and its effectiveness depends significantly on the structure of the humanitarian network. For instance, a more central or connected organisation within the network is better positioned to lead disaster response efforts, ensuring that lives and property are protected promptly.

Coordination acts as a link between the disaster response network structure, facilitating logistics aspects, information sharing, resource management, communication, stakeholder management, and partnerships among responding organisations. Leading scholars in the field of disaster management contend that without coordination, no humanitarian organisation is adequately prepared to respond, as each organisation and disaster is unique.

From the findings, it can be said that where the actor network is well-structured, responding humanitarian organisations can rapidly restore lives, property, and the social systems and functioning of institutions.

Implications

This study aimed to investigate the impact of network structure and coordination on disaster response in Uganda. Grounded in both literature and empirical data, the study makes a meaningful contribution to the evolving body of knowledge in humanitarian disaster response. A central contribution of this research lies in its ability to bridge a significant gap in theory. While previous studies have acknowledged the importance of networks and coordination in disaster management, they often treat these elements in isolation or describe them in general terms. Most existing literature stops at identifying coordination challenges or mapping inter-organizational links without explaining how coordination operates as a bridge between network structure and disaster response effectiveness. This study moves beyond such descriptive approaches by empirically demonstrating the mediating role of coordination, showing how coordination transforms the potential embedded in organisational networks into tangible disaster response outcomes. The research underscores the importance of strengthening the structure and connectivity of humanitarian networks. Practitioners should recognise that a well-structured and well-connected network is foundational to effective coordination.

Limitations

This study examined the mediation effect of coordination in the relationship between network structure and disaster response in Uganda. As a result, they may have limitations in their contextual scope. Additionally, the study unit of analysis was humanitarian organisations, which meant that some other organisations that participate in humanitarian activities but are not registered as such

were left out. However, we are confident that the sample size was adequate, representing the types of humanitarian organisations. Furthermore, methodologically, we employed a cross-sectional research design. We suggest that similar studies could employ other methodologies, such as longitudinal or interpretative phenomenological analysis, to provide diverse findings.

6. Conclusion

In conclusion, given its geographical context in a developing country like Uganda, this research provides valuable insights into how humanitarian organisations can enhance their disaster response capacity, especially in similar disaster-prone geographical contexts. By prioritising organisational network structures and coordination, disaster management practitioners can better navigate the complex realities of disaster environments in developing countries. These findings offer a practical roadmap for enhancing humanitarian action and achieving more effective outcomes for vulnerable communities. The fact that coordination partially mediates the relationship between network structure and disaster response suggests that there may be other variables or factors that could explain complete mediation. Therefore, this could serve as a basis for further research.

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