Achieving Disaster Responsiveness Under Conditions of Dysfunctional Humanitarian Environment: The Role of Coopetition and Disaster Preparedness

Thesis submitted in partial fulfilment of the requirements for Doctor of Philosophy

By

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DEDICATION

I dedicate the work to my late wife, Mrs. Bridget Ama Briston-Adobor

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DECLARATION

I hereby declare that this thesis does not contain any material that has been previously submitted, in whole or in part, for a degree at Brunel University or any other institution.

I further affirm that this thesis represents my independent work. All ideas, information, and conclusions presented in this thesis are the result of my effort, except where specific acknowledgements have been made to the contributions of others.

Michael Briston Kwesi Adobor

ABSTRACT

In recent years, the increasing frequency and complexity of disasters—often occurring in environments marked by weak governance, limited resources, and fragmented coordination—have underscored the need for more resilient and adaptive humanitarian systems. In such settings, traditional competitive and siloed approaches among humanitarian organisations have proven inadequate. As a result, coopetition, which blends cooperation and competition, has emerged as a strategic model for enhancing disaster management outcomes. This study investigates the role of coopetition among humanitarian organisations in shaping disaster preparedness and disaster responsiveness within the context of a dysfunctional humanitarian environment, using Ghana as a case study. Guided by Cooperation Theory and Co-creation Theory, the research conceptualises preparedness and responsiveness as outcomes of interactive stakeholder engagements, where value is generated through shared goals, resource integration, and mutual influence, even in the face of institutional constraints. Data were collected through structured questionnaires administered to 235 professionals across governmental and non-governmental disaster management organisations. The analysis employed descriptive statistics and Partial Least Squares Structural Equation Modelling (PLS-SEM) to examine direct, mediated, and moderated relationships among the key constructs. The findings indicate that coopetition significantly enhances both disaster preparedness and responsiveness, with preparedness partially mediating the effect of coopetition on responsiveness. Moreover, the study finds that the dysfunctional humanitarian environment significantly moderates the relationship between coopetition and preparedness, highlighting how contextual barriers such as corruption, fragmented coordination, and resource mismanagement can shape collaborative outcomes. These insights affirm the relevance of co-creation and cooperation theories in explaining how inter-organisational collaboration under competitive pressures can foster adaptive capacity in disaster-prone and institutionally fragile contexts. The study advances theoretical understanding of coopetition in disaster management and provides practical guidance for humanitarian actors. Key recommendations include leveraging cooperative frameworks to build shared early warning systems, institutionalising trust-based governance mechanisms, and implementing transparent resource management strategies. The research offers valuable implications for policymakers, humanitarian practitioners, and organisational leaders seeking to strengthen disaster response systems in complex and dysfunctional environments.

Keywords: Coopetition; Disaster Preparedness; Disaster Responsiveness; Dysfunctional Humanitarian Environment; Co-creation Theory; Cooperation Theory

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Abbreviation	Explanation
NDM	Natural Disaster Management
GM	Government Mechanisms
SC	Supply Chain
SCM	Supply Chain Management
HDRSC	Humanitarian Disaster Relief Supply Chains
UN	United Nations
SDGs	Sustainable Development Goals
NGO	Non-Governmental Organisation
CARE	Cooperative for Assistance and Relief Everywhere
SC	Save the Children
CRS	Catholic Relief Services
WVI	World Vision International
NDMO	National Disaster and Management Organisation
GNFS	Ghana National Fire Service
GPS	Ghana Police Service
GMS	Ghana Military Service
WHO	World Health Organisation
UNISDR	United Nations Office for Disaster Risk Reduction
IDPR	International Development Planning Review
IDMC	International Displacement Monitoring Centre
ICT	Information and Communication Technology
DP	Disaster Preparedness
DR	Disaster Responsiveness
DHE	Dysfunctional Humanitarian Environment

CHAPTER ONE

INTRODUCTION

1.1 Background

Humanitarian logistics has garnered increasing global attention within disaster management due to the rising frequency and severity of humanitarian crises worldwide (Dolinskaya et al., 2018; Negi, 2022). Managing disasters caused by natural hazards encompasses a broad range of activities, including addressing the basic needs of survivors, protecting assets from further damage, and ensuring the delivery of essential supplies such as food, water, shelter, and medicine (Day et al., 2012; Kumar, 2025). A critical function within this domain is the development of effective supply chains to ensure the timely delivery of aid, a function broadly referred to as humanitarian logistics. It involves a complex system of strategies, processes, and technologies tailored to sustain the flow of necessary goods and services during disaster situations.

The operational landscape of humanitarian disaster relief supply chains (HDRSCs) is especially demanding in developing economies. These environments present challenges that differ significantly from those in commercial supply chains, necessitating specialised capabilities and approaches (Samari & Groot, 2025; Behl & Dutta, 2019a; Day et al., 2012). Disasters caused by natural hazards are inherently unpredictable and chaotic, often resulting in extensive human casualties and infrastructure damage (Hapsari & Zenurianto, 2016; Mukherjee & Singh, 2020; Wang, Wah, & Cao, 2022). Recent global catastrophes, such as Hurricane Katrina, have underscored the importance of efficient disaster response in mitigating human suffering. Unlike commercial objectives focused

on profit, the primary goal of HDRSCs is the preservation and recovery of human life (Corbett et al., 2022; Tomasini et al., 2009).

Information management plays a pivotal role in enhancing the efficiency of HDRSCs. Effective disaster response relies heavily on the collaborative efforts of humanitarian agencies and government institutions to share timely, standardised data (Bealt et al., 2016). This coordination ensures the prompt delivery of relief items and facilitates strategic decision-making (Maghsoudi et al., 2018). Natural disasters thus test the capacity of societal systems to respond quickly and collaboratively. Effective responses require the integration of efforts by governments, military forces, civil society, and humanitarian organisations (Orengo et al., 2022).

However, in times of disaster, even organisations that typically compete—such as NGOs vying for grants—must unite to maximise the impact of aid. This reality is particularly pronounced in Africa, where disaster response capabilities are often limited due to underdeveloped infrastructure and fragile supply chain systems (Hallegatte et al., 2016; Lopes et al., 2022). The continent's diverse cultural and environmental landscape necessitates an adaptable and comprehensive disaster management approach (Day et al., 2012).

Effective disaster management not only reduces human suffering but also supports the achievement of global objectives such as the United Nations Sustainable Development Goals (SDGs) [(United Nations, 2015)]. Achieving this requires integrated supply chain strategies that go beyond logistics to encompass coordination, cost optimisation, and data collection for future preparedness (Adams et al., 2024; Paton, 2003). While commercial

supply chains prioritise cost efficiency and profitability, HDRSCs focus on delivering the right aid, at the right place, and at the right time, without compromising quality.

International aid efforts by governments, the United Nations, and non-governmental organisations (NGOs) have played a crucial role in saving lives during crises in Africa. Major NGOs such as CARE, Save the Children, and World Vision have consistently provided emergency assistance in countries facing war and disasters caused by natural hazards (Jamieson, 2005; Shimada, 2022). Despite these commendable efforts, some scholars argue that corruption, theft, and mismanagement often undermine humanitarian operations (Bloe, 2023). Illicit activities such as smuggling, aid diversion, and black-market trading have been documented as significant issues that jeopardise aid effectiveness (Tomasini, 2009; Ogunro et al., 2022).

In Ghana, addressing dysfunctions such as procurement irregularities and theft is crucial for achieving cost savings and an effective disaster response (Echendu, 2022). The failure to quickly replace stolen or diverted items exacerbates crises and endangers lives. Hence, securing supply chains becomes a top priority. Unlike commercial supply chains, humanitarian logistics must address tighter time constraints and security risks, especially in the immediate aftermath of a disaster when critical goods become prime targets for criminal exploitation (Lokmic-Tomkins et al., 2023). Protecting supply chain data and fostering employee engagement through positive reinforcement, rather than punitive measures, can reduce internal theft and increase operational integrity.

In Ghana, slow response times, limited availability of relief materials, and ineffective governmental coordination have led to significant loss of life during disasters caused by natural hazards. Given this reality, it is essential to understand how *coopetition*, the

strategic collaboration between competing humanitarian organisations, can enhance disaster preparedness. Coopetition enables organisations to share resources and knowledge during crises, while maintaining competitiveness in securing funds and support. This study examines how coopetition enables humanitarian actors to overcome dysfunctions in the humanitarian sector and enhance their preparedness for disaster response.

1.2 Statement of the Problem

Humanitarian supply chain responses to natural disasters in Ghana are severely undermined by dysfunctions such as theft, corruption, and procurement breaches, which delay aid delivery, create artificial shortages, and discourage donor contributions. These challenges are especially detrimental in a country frequently exposed to natural disasters—such as floods, droughts, and storms—where infrastructural limitations and fragile logistical systems exacerbate response complexities. Despite the pressing need for timely and effective disaster responsiveness, existing research has largely overlooked how humanitarian organisations can function optimally in such dysfunctional environments. While previous studies have addressed disaster planning, anti-corruption initiatives, and logistical risk management, few have examined the role of *coopetition*—strategic collaboration among competing organisations—in enhancing disaster preparedness and responsiveness amid systemic dysfunction. This overlooked area represents a critical gap in the literature. It underscores the necessity of understanding how humanitarian actors can strategically navigate corruption and operational inefficiencies to improve aid delivery in disaster-prone, resource-constrained settings like Ghana.

Humanitarian supply chains are designed to deliver timely aid and relief to populations affected by disasters. However, in many developing countries, these systems are often undermined by deeply rooted dysfunctions, including theft, corruption, procurement breaches, and operational inefficiencies. These challenges delay supply chain responses and reduce the availability of relief items, which are often limited and barely adequate to manage the scale of need during disaster events (Bloe, 2023). Dysfunctional activities not only disrupt the logistics and distribution of aid but also erode public trust and donor confidence, creating significant obstacles to achieving disaster preparedness and responsiveness.

In humanitarian logistics, the complexity of delivering aid to remote areas with weak infrastructure, limited skilled labour, and logistical constraints is already high. When coupled with corruption and theft, establishing an agile and responsive supply chain becomes nearly impossible. While commercial supply chains operate with a focus on efficiency, cost-effectiveness, and profit, humanitarian supply chains must prioritise speed, equity, and survival, often in unpredictable and volatile environments. As noted by scholars, the traditional concept of agility must be redefined in humanitarian logistics to meet the needs of both disaster victims and donors (Nayak & Choudhary, 2022; Oloruntoba & Grey, 2000). In this context, agility is not only about speed but also about adaptability to unstable funding sources, unreliable partners, and frequently shifting ground realities (Bennett & Kottasz, 2000; Shen et al., 2022).

The present study focuses specifically on natural disasters, rather than man-made ones, due to Ghana's geographic and climatic conditions. The country is becoming increasingly vulnerable to natural hazards, including earthquakes, droughts, flooding, and coastal

erosion. With climate change intensifying the frequency and severity of these events, there is an urgent need to understand their implications for humanitarian logistics and disaster response. According to the United Nations Office for Disaster Risk Reduction (UNISDR, 2019), Ghana has experienced numerous natural disaster events over the past decade—primarily floods, droughts, and storms—while man-made disasters have been relatively rare. The World Health Organisation (WHO) has similarly warned that rising global temperatures and shifting weather patterns are accelerating the rate of natural disasters, particularly in climate-vulnerable regions like West Africa.

The human and economic toll of these disasters in Ghana has been staggering. Between 2010 and 2021, approximately 211,300 individuals were displaced by 67 disaster events, of which 191,300—over 90%—were caused by flooding [(Internal Displacement Monitoring Centre, 2021)]. For example, the unprecedented floods of November 2010 affected 55 communities, displaced over 700,000 people, destroyed thousands of homes, and submerged tens of thousands of acres of farmland. The June 2015 floods were equally catastrophic, claiming over 150 lives and leading to widespread devastation. These disasters not only destroy property and displace communities but also contribute to secondary crises such as food insecurity, disease outbreaks, and economic instability.

In addition to flooding, Ghana has experienced a diverse range of natural hazards, including forest fires, heat waves, dust storms, hailstorms, landslides, and earthquakes. In 2016, for instance, a massive forest fire in Kakum National Park destroyed critical wildlife habitats, while a dust storm in Accra posed severe respiratory threats to residents (Mensah-Bonsu, 2022). In 2023, high rainfall led to the overflow of the Akosombo Dam, causing severe flooding downstream, which devastated livelihoods and properties across

multiple regions (De-Souza & Amfo, 2024; UNICEF, 2023). In the aftermath of such disasters, criminal exploitation often emerges. Individuals with corrupt intentions take advantage of the chaos to loot aid supplies, inflate procurement costs, and divert resources for personal gain. These actions create artificial shortages, escalate government spending, and exacerbate the suffering of affected populations. They also discourage donor participation and erode public confidence in relief organisations.

Despite the critical importance of mitigating these challenges, current research has not sufficiently addressed the dysfunctional nature of the humanitarian logistics environment in Ghana and similar settings. Existing studies often focus on disaster planning, government responses, or general strategies to prevent corruption (Awuah-Gyawu et al., 2019; Purnama et al., 2020; Saharan, 2015; Ha, 2023; Alexander, 2017). While these contributions are valuable, they rarely explore how humanitarian actors continue to function and deliver aid effectively within corrupt or dysfunctional environments. Moreover, they do not address how organisations can achieve disaster responsiveness—defined as the ability to quickly and effectively respond to disaster impacts—under such challenging conditions.

A promising yet underexplored strategy in this context is coopetition. In this hybrid model, humanitarian organisations collaborate during disasters while continuing to compete for limited resources such as donor funding and recognition. In many humanitarian settings, NGOs and international organisations often operate with overlapping mandates and objectives. Coopetition allows them to share logistics platforms, information, and resources during crises, even while maintaining competition in other areas. Although coopetition has been discussed in business and innovation literature, its application in

humanitarian disaster management—especially in dysfunctional environments—has received little scholarly attention.

There is a notable gap in the literature regarding how coopetition can facilitate disaster preparedness and responsiveness in environments plagued by corruption and inefficiency. While studies by Awuah-Gyawu et al. (2019) and Dwivedi et al. (2018) have examined factors such as stakeholder coordination and attitudes toward disaster management, they do not evaluate how coopetition operates under conditions of systemic dysfunction. Similarly, research by Ekwall and Lantz (2017) on cargo theft offers important insights into logistical vulnerabilities, but it does not connect these issues to broader preparedness strategies. The failure to examine coopetition as a mechanism for navigating dysfunctional humanitarian environments represents a significant research gap.

Therefore, this study aims to fill the identified research gap by examining how coopetition among humanitarian organisations can enhance disaster preparedness and responsiveness in the face of systemic dysfunctions such as corruption, theft, and procurement breaches. This inquiry is particularly relevant to Ghana and similar emerging economies where weak institutional structures, limited logistical capacity, and governance challenges frequently undermine effective disaster response. Guided by well-defined objectives, the study investigates the direct relationship between coopetition and both preparedness and responsiveness, the mediating role of disaster preparedness, and the moderating influence of dysfunctional humanitarian environments. These objectives provide a structured analytical framework for understanding how strategic collaboration

among competing humanitarian actors can overcome operational inefficiencies and deliver more effective aid in disaster-prone, resource-constrained settings.

By exploring the interplay between coopetition, dysfunction, and disaster responsiveness, this study aims to make a novel contribution to the literature on humanitarian logistics and disaster management. It will provide policymakers, donor agencies, and humanitarian organisations with practical insights on how to build more resilient and adaptive systems for disaster response, despite the persistent challenges posed by dysfunctional environments.

1.3 Research Questions

The study seeks to answer the following research question:

What is the role of coopetition in shaping organisational capacities for preparedness and responsiveness in humanitarian disaster management, and how do contextual dynamics moderate this relationship?

1.4 Aim of the Study

The primary objective of the study is to investigate the impact of coopetition among humanitarian organisations on disaster responsiveness in a dysfunctional humanitarian environment in Ghana.

1.4.1 Research Objectives

To achieve the above-mentioned goal, the study aims to accomplish four specific objectives, as follows.

1. To examine the relationship between coopetition and disaster preparedness.
2. To examine the relationship between coopetition and disaster responsiveness

3. To examine the moderating role of a dysfunctional humanitarian environment on the relationship between coopetition and disaster preparedness.
4. To assess the relationship between disaster preparedness and disaster responsiveness.
5. To examine how disaster preparedness mediates the relationship between coopetition and disaster responsiveness.

1.5 Contributions of the Study

Investigating criminal activities in the supply of relief items and provisions during natural disaster management operations is highly relevant to all stakeholders in disaster management and supply chain operations. The key importance is as follows: Understanding how coopetition influences disaster responsiveness in a dysfunctional environment provides decision-makers with valuable guidance (Massari & Giannoccaro, 2021). This knowledge can inform strategic decisions related to collaboration, competition, and resource allocation, optimising the overall impact of humanitarian interventions.

By examining the relationship between coopetition and disaster preparedness, the study can offer actionable insights to enhance collaboration strategies among humanitarian organisations (Baruch & Lin, 2012). Identifying effective cooperative practices can contribute to a more cohesive and coordinated response during crises.

Recognising the moderating role of a dysfunctional humanitarian environment provides a basis for tailoring interventions to address specific challenges within such contexts (Saharan, 2015). This understanding allows for the development of targeted measures to overcome barriers that may hinder effective coopetition. It will enhance the confidence of

philanthropists in giving to disaster victims (Saharan, 2015). That is, it will encourage individual philanthropism in natural disaster management.

It will enable institutions and state agencies responsible for natural disaster management activities to reassess and revise their disaster management preparations and operations (Ha, 2023).

This study also makes key theoretical contributions to disaster management, coopetition, and humanitarian logistics by integrating Co-creation and Cooperation Theories. It extends Co-creation Theory by showing how coopetition among humanitarian organisations drives knowledge sharing and innovation, improving preparedness under crisis conditions (Schiffling et al., 2020; Crick & Crick, 2020). It also advances Cooperation Theory by illustrating how organisations in disaster settings simultaneously collaborate for preparedness and compete for limited resources, enhancing resilience and response (Fathalikhani et al., 2020). A novel contribution is the introduction of the dysfunctional humanitarian environment as a moderating factor in the coopetition–preparedness link, showing that dysfunction both impedes and necessitates collaboration (Alexander, 2017). The study bridges the concepts of coopetition and humanitarian logistics, positioning coopetition as a core strategy for managing supply chain complexity during disasters. It also identifies disaster preparedness as a key mediator between coopetition and responsiveness, highlighting how shared innovation enables effective response (Crick & Crick, 2020). Using Ghana as a case study, the research contextualises coopetition in a resource-constrained and corruption-prone setting, offering theoretical insights relevant to other developing economies.

1.6 Scope of the Study

In line with Dubey et al. (2021), this study examines how coopetition among humanitarian organisations can enhance disaster responsiveness through disaster preparedness, particularly under dysfunctional humanitarian conditions, such as theft within the supply chain during disaster management in developing economies. The study uses Ghana as a case study. Grounded in Co-creation Theory and Cooperation Theory, the study explores how collaborative and competitive dynamics among organisations contribute to value creation, resource sharing, and adaptive crisis response within constrained and corruption-prone environments. The research population, consistent with Moshtari et al. (2021), includes institutions and organisations involved in natural disaster management in Ghana. These include the National Disaster Management Organisation (NADMO) (www.nadmo.gov.gh), the Ghana National Fire Service (GNFS) (www.gnfs.gov.gh), the Ghana Police Service, and other relevant disaster management agencies.

The study focuses on four key variables: coopetition among humanitarian organisations, dysfunctional humanitarian environmental conditions (e.g., theft), disaster preparedness, and disaster responsiveness within the broader disaster management framework. Disaster victims were not included in the study population, as the research aimed to assess strategic, institutional-level dynamics and decision-making processes among organisations responsible for planning and implementing disaster response. Victims were excluded due to ethical and practical concerns, including the risk of emotional distress, the difficulty of obtaining informed consent in crisis-affected populations, and the study's focus on systemic, operational, and managerial factors rather than individual experiences. The primary objective is to assess the effect of coopetition on disaster responsiveness,

with disaster preparedness as a mediating factor and dysfunctional humanitarian environment as a moderating variable, providing theoretical insights and practical guidance for managing natural disaster-related events in fragile settings.

1.7 Overview of Methodology

This study adopts a positivist research paradigm and a quantitative approach to examine the impact of coopetition on disaster responsiveness through disaster preparedness, with the dysfunctional humanitarian environment as a moderating variable. Grounded in Co-creation Theory and Cooperation Theory, the study is designed to test hypothesised relationships using a descriptive research design empirically.

The population consists of institutions involved in natural disaster management in Ghana, including the National Disaster Management Organisation (NADMO), the Ghana Police Service, the Ghana National Fire Service, non-governmental organisations (NGOs), and faith-based organisations. A sample size of 218 respondents was used for the study. Given the absence of a central sampling frame, data were sourced from the Ghana Yellow online directory, and a multi-method sampling strategy was used, including cluster, convenience, and snowball sampling to ensure broad and practical representation.

Data were collected using a structured questionnaire featuring a 7-point Likert scale, with items adapted from validated sources that covered coopetition, disaster preparedness, dysfunctional environments, and disaster responsiveness. The questionnaire was pilot-tested and validated through expert review, Cronbach’s alpha for reliability, and factor analysis for construct validity.

For data analysis, the study employed Partial Least Squares Structural Equation Modelling (PLS-SEM), chosen for its suitability in prediction-oriented, exploratory research with moderate sample sizes and complex models. PLS-SEM enabled analysis of both reflective and formative constructs and was supported by bootstrapping (5,000 resamples) to ensure statistical robustness. Key analytical techniques included assessments of reliability, convergent and discriminant validity, and R^2 values to evaluate explanatory power. Ethical standards were rigorously upheld through the use of informed consent, anonymity, and sensitivity to participant welfare.

1.8 The Ghana Context

Ghana is becoming increasingly vulnerable to natural disasters, including floods, droughts, and coastal erosion, due to rapid urbanisation, climate change, and inadequate infrastructure planning. Flooding is the most frequent and destructive hazard, particularly in urban areas like Accra, often resulting in displacement, infrastructure loss, and fatalities (Nkrumah & Amponsah, 2023). In 2015, severe flooding in Accra resulted in over 150 deaths, exposing systemic gaps in disaster response and preparedness mechanisms.

Despite the mandate of the National Disaster Management Organisation (NADMO) to coordinate disaster management, challenges persist due to inadequate coordination, weak institutional capacity, and delayed response time (Oteng-Ababio, 2013). Humanitarian logistics in Ghana face significant bottlenecks, including resource shortages, fragmented stakeholder collaboration, and theft within the supply chain, which compromise rapid disaster relief operations (Baidoo, 2018).

The country's disaster response is further hampered by top-down management approaches, low community involvement, and poor preparedness planning, particularly

at the local level (Owusu et al., 2021). As natural disasters become more frequent and severe due to climate change, there is a growing need for improved coordination among actors and strategic frameworks, such as coopetition, to enhance preparedness and responsiveness in dysfunctional humanitarian environments.

1.9 Definition of Terms

Disaster preparedness is the proactive and systematic efforts taken by humanitarian organisations to minimise the impact of disasters (Abunyewah et al., 2015)

Disaster responsiveness is the prompt initiation of actions to meet immediate needs during a disaster (Mwangi & Anaya, 2020).

A dysfunctional humanitarian environment refers to an environment marked by mismanagement and inefficiencies that impede the effective delivery of humanitarian aid, including issues such as theft and resource misallocation (Liu & Atuahene, 2018).

Natural Disaster Management in this study encompasses all the various resources, strategies, and technical expertise, as well as plans and measures, that are used or relied upon to handle activities and processes before, during, and after natural disaster occurrences (Bonye et al., 2011).

Coopetition is a business strategy in which competitors collaborate on specific projects or aspects while simultaneously competing in other areas (Riquelme-Medina et al., 2022).

1.10 Organisational Structure

This study follows a six-chapter structure and is organised as follows. Chapter One is the introduction. It provides an overview of the study, which includes the background, research problem, study aim, research questions and objectives, hypothesis, scope (delimitation), and significance of the study, as well as a definition of key terms. Chapter Two is a literature review, providing a comprehensive synthesis of literature findings and perspectives on the phenomenon being investigated. This includes literature on various concepts and theoretical models applicable to the study. This is followed by Chapter Three, which outlines the research methodology. It presents a comprehensive discussion of the methodological approach employed in conducting the study, including research paradigms and philosophies, strategies and methods, as well as sampling and data collection techniques. The Chapter Four follows with the results of the data analysis. This presentation outlines the main findings from the data analysis techniques applied to the collected data. The chapter Five is the discussion of the results obtained from the data analysis. The study concludes with Chapter Six, which presents a summary of the main research findings and the overall suppositions made, followed by an examination of the limitations encountered during the research and the proposed recommendations for future researchers to overcome these limitations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section presents a literature review of previous studies on disaster management. This encompasses the conceptualisation of disaster management, which includes definitions and a general overview of the concept. It also conceptualises coopetition and a dysfunctional humanitarian environment. The literature also reveals the historical evolution of modern disaster management, which aims to explore how disaster management practices have evolved. Other sections of the literature examine the impact of the supply chain, the actors and players within it, challenges in the supply chain for disaster management, and theories such as institutional theory, co-creation theory, and cooperation theory. Hypothesis development is also presented, along with the conceptual framework of the study, based on relevant theories and empirical literature.

2.2 Conceptualisation of Disaster Management

2.2.1 Definitions

The complexity of conceptualising Disaster management arises from its broad and multifaceted definitions, which hinder its analytical applicability. As Tanasic & Vladimir (2024) assert, there is a lack of consensus in defining Disaster management, with each author seemingly offering a unique interpretation. Orru et al. (2022) also said that a lack of clarity characterises the concept of disaster management and is subject to differing interpretations. The following shows the different definitions.

Mohamed Shaluf (2008) defined disaster management as a comprehensive concept that covers various elements related to the preparation and response to disasters. This includes activities conducted both before a disaster occurs and those carried out in the aftermath of a disaster. It comprises a comprehensive approach to addressing both the risks and consequences associated with disasters. In this context, disaster management is conceptualised as encompassing the collection of policy and administrative choices, operational endeavours, stakeholders, and technological interventions relevant to the different phases of a disaster, across various levels of governance.

Kapucu (2012) defined disaster management as the systematic coordination and administration of resources and obligations aimed at addressing the various humanitarian dimensions of emergencies, with a specific focus on preparedness, response, and recovery. The primary goal of disaster management is to mitigate the adverse effects of disasters.

According to Elliott (2014), disaster management refers to the systematic approach employed to address the various consequences of a disaster, including its impact on human beings, physical resources, economic conditions, and the environment. It encompasses the entire process of preparing for, responding to, and learning from significant failures. While natural causes are frequently responsible, disasters can also be attributed to human actions.

However, Park et al. (2019) said that irrespective of the specific nature of disasters or emergencies, the concept of disaster management includes a systematic approach comprising mitigation, preparedness, response, and recovery. Currently, the UNDRR (2023) has proposed a widely recognised and contemporary definition of disaster

management, which entails the strategic emphasis on formulating and executing preparedness measures and other initiatives aimed at mitigating the adverse consequences of disasters and facilitating a more resilient recovery process. Overall, disaster management encompasses activities such as mitigation, preparedness, response, and recovery. This study focuses on disaster preparedness and disaster response.

Khan & Shamim (2022) define disaster management as *"preparation, prevention, response, and recovery functions in an affected area."* Their research emphasises that managing vulnerability is key to reducing disaster risk and highlights the importance of integrating local knowledge and institutional efforts to enhance resilience.

Rodríguez-Coca et al. (2024) describe disaster management as *"a comprehensive range of activities divided into three main phases: pre-disaster (preparedness and mitigation), response, and recovery."* Their study finds that adequate pre-disaster planning significantly reduces human and economic losses.

Hunt & Zhuang (2022) define disaster management as *"a unique form of operations management in which emergency service providers and humanitarian agencies deliver resources before, during, and after disasters."* They argue that technology, such as blockchain, can enhance coordination, communication, and transparency in disaster response.

Table 2.1: Definitions of Disaster Management

Author(s)	Definition of Disaster Management
Mohamed Shaluf (2008)	A comprehensive concept that covers various elements related to the preparation and response to disasters.
Kapucu (2012)	The systematic coordination and administration of resources and obligations aimed at addressing the various humanitarian dimensions of emergencies, with a specific focus on preparedness, response, and recovery.
Elliott (2014)	The systematic approach employed to address the various consequences of a disaster, including its impact on human beings, physical resources, economic conditions, and the environment.
Park et al. (2019)	A systematic approach comprising mitigation, preparedness, response, and recovery during a disaster.
UNDRR (2023)	The strategic emphasis is on formulating and executing preparedness measures and other initiatives aimed at mitigating the adverse consequences of disasters and facilitating a more resilient recovery process.
Khan & Shamim (2022)	Preparation, prevention, response, and recovery functions in an affected area.
Rodríguez-Coca et al. (2024)	A comprehensive range of activities is divided into three main phases: pre-disaster (preparedness and mitigation), response, and recovery.
Hunt & Zhuang (2022)	A unique form of operations management in which emergency service providers and humanitarian agencies deliver resources before, during, and after disasters.

2.2.2 Overview of Disasters and Their Management in Ghana

Several studies have been conducted on disaster management in Ghana. For instance, Awuah-Gyawu et al. (2019) and Bonye et al. (2011) demonstrated that although disasters are so varied in Ghana, disasters may be grouped under man- made and natural disasters; however, certain unsustainable human activities, such as the diversion of river bodies, mining, among others, easily trigger such natural disasters. Natural disasters include rain and windstorms, earthquakes and landslides, and volcanic eruptions. Man-made disasters may consist of acts of war and terrorism, fire outbreaks, explosions, liquid chemical spillages, and the collapse of buildings. Disaster management is a key factor in

driving the successful execution of relief efforts, and it begins with the strategic design of a process.

Bonye et al. (2011) found that among the most frequent disasters in Ghana, drought and soil erosion accounted for 10% of the responses, while bushfires accounted for 15%. Others include floods (39%) and livestock diseases (35%). The high percentage indicated in the study on floods reflects the floods that occurred in 2007. However, the magnitude of disasters is not determined solely by floodwater, but also by the pattern of vulnerability in which people live.

In view of this, Awuah-Gyawu et al. (2019) in a study in Ghana also asserted that human preparedness is key to mitigating the negative impacts of disasters, averting such situations, or reducing the level of impact by providing countermeasures, infrastructure, and strategic plans for relief operations in advance. Awuah-Gyawu et al. (2019) also noted that effective Disaster Management involves planning, resource management, and coordination among stakeholders. In the case of the resource management construct, respondents emphasised the need for effective stock control of goods and materials necessary to prevent or mitigate disasters. They explained that several categories of goods, materials, tools, technologies, and relief items are required to avoid and mitigate disasters. Without them, even with an effective transportation system, effective disaster preparedness cannot be ensured. Awuah-Gyawu et al. also emphasised the need to effectively disseminate disaster information to key stakeholders and the entire citizenry promptly and with great care, to prevent extreme fear and panic, and to divert disaster resources while managing potential disasters or their impact.

A seminal study conducted by Ahadzie and Proverbs (2011) revealed that the history of natural disasters in Ghana dates back to 1936. Since then, this issue has become persistent and escalating, causing the inundation of major cities and urban areas in the country. The authors of the study concluded that the current strategy for managing natural disasters in Ghana requires further refinement and development. With the increasing population and urbanisation, the adverse effects of natural disasters are likely to become more pronounced in the future, necessitating a comprehensive and integrated approach to risk management. This would require an in-depth analysis of the situation and the formulation of policies aimed at developing a comprehensive plan for natural disaster response and recovery, along with the implementation of a robust educational program to raise awareness and understanding of safety measures during natural events. The following explains in detail the Elements of Natural Disaster Management

The authors utilised the VanWassenhove (2006) Stages in humanitarian logistics and supply chain as their initial model, which consists of four stages: (1) Mitigation, (2) Preparation, (3) Response, and (4) Reconstruction/Recovery.

Figure 2.1 Disaster Management Cycle
Source: VanWassenhove (2006)

Mitigation

Mitigation is a crucial phase in the disaster management cycle, involving a range of measures and approaches designed to reduce the consequences of natural disasters and mitigate the potential harm and losses they can cause (Tay et al., 2022; Holguin-Veras et al., 2012). The primary objective of mitigation is to prevent or halt the incidence of catastrophic events, while also reducing their impact on human lives, assets, and the natural surroundings (Smith et al., 2023). The proactive strategy of disaster management emphasises the reduction of vulnerability and the development of resilience within communities, hence augmenting their ability to effectively manage and recover from disasters (Altay et al., 2018).

The implementation of mitigation measures is crucial in promoting sustainable development and reducing the risks associated with disasters (Munawar et al., 2022). Various types of natural disasters, including earthquakes, floods, hurricanes, tsunamis, wildfires, and others, can be addressed through the implementation of mitigation measures (Dissanayaka et al., 2022). The strategies discussed in the literature can be categorised as either structural or non-structural. Structural measures refer to engineering solutions and land-use planning, while non-structural measures comprise policy development, public awareness campaigns, and educational programs (Amardi, 2024).

Structural mitigation strategies encompass the implementation of tangible infrastructure designed to endure the impact of a disaster (Aulia et al., 2019). As exemplified by Armadi (2024), several measures can be taken to mitigate the effects of natural disasters, such

as constructing earthquake-resistant infrastructures, establishing flood barriers and levees, and implementing firebreaks to impede the propagation of wildfires. The purpose of structural measures is to guarantee the resilience of the built environment against the destructive effects of catastrophes, thereby safeguarding the lives and properties of the affected population (Altay et al., 2018).

In contrast, non-structural mitigation methods aim to decrease vulnerabilities and strengthen community resilience through alternative approaches (Aulia et al., 2019). The implementation of measures such as the adoption of construction codes and land-use rules, the promotion of early warning systems, the establishment of evacuation plans, and the dissemination of information to educate the public on disaster preparedness have been suggested as potential strategies (Altay et al., 2018; Haddow et al., 2013). The implementation of non-structural measures plays a vital role in cultivating a safety-oriented environment and guaranteeing that communities possess the necessary readiness to efficiently address and manage disasters (Armardi, 2024; Kunz et al., 2014; Duran et al., 2011).

The inclusion of mitigation within the disaster management cycle is a foundational element in reducing the vulnerability of communities and minimising the overall social, environmental, and economic impacts of disasters. Unlike reactive measures, which only address consequences after they occur, mitigation is inherently proactive. It aims to eliminate or significantly reduce the factors that contribute to disaster risk, such as unsafe infrastructure, poor land use, environmental degradation, and social inequalities. By directly addressing the root causes of exposure and susceptibility, mitigation not only reduces the severity of disaster impacts but also lessens the reliance on extensive

response and recovery operations, which are often more costly and time-consuming (Tay et al., 2022).

Mitigation efforts are typically categorised into structural and non-structural approaches. Structural mitigation includes tangible interventions such as the construction of flood levees, earthquake-resistant buildings, cyclone shelters, and other hazard-proof infrastructure. These measures physically protect people and assets from harm. On the other hand, non-structural mitigation encompasses policies, regulations, education, and planning measures, including land-use zoning, early warning systems, and awareness campaigns. When governments and communities invest in both types of mitigation, they safeguard not only lives and property but also environmental assets, local economies, and development gains. Significantly, such investments also contribute to reducing long-term recovery costs, making mitigation an economically prudent strategy (Sharma, 2021).

Governmental institutions play a central role in leading and institutionalising mitigation strategies. At both national and local levels, governments are responsible for enacting and enforcing safety regulations such as building codes, environmental policies, and zoning laws that prevent development in high-risk areas. In addition, governments are tasked with developing national disaster mitigation policies, allocating resources through dedicated funds, and coordinating cross-sectoral efforts that involve multiple agencies and stakeholders. These initiatives must be backed by strong political will, inter-agency collaboration, and sufficient administrative capacity. Without these enablers, even well-designed mitigation policies can remain ineffective on the ground (Shalehanti et al., 2023).

Crucially, government-led mitigation is most effective when it is inclusive and participatory. Community engagement is not a supplementary activity—it is a cornerstone of sustainable risk reduction. When residents are involved in identifying local hazards, mapping vulnerabilities, and co-developing mitigation plans, they are more likely to trust and comply with policies and take initiative to protect themselves. Such involvement fosters a culture of preparedness, strengthens social cohesion, and mobilises local knowledge and resources for risk reduction (Tanesab, 2020). Community-based disaster risk management, which empowers people at the grassroots level, has emerged as a proven model for enhancing local resilience (Trohanis et al., 2022).

However, one of the persistent challenges in effective mitigation is identifying, evaluating, and prioritising hazards. Risk is often multi-dimensional and context-specific, requiring interdisciplinary approaches that combine environmental science, social data, engineering, and economics. Advanced risk assessments, incorporating technologies such as GIS, remote sensing, and machine learning, are essential for understanding the probability and consequences of various hazards. These assessments enable decision-makers to target investments where they are most needed and cost-effective. Moreover, in our increasingly interconnected world, it is vital to consider cascading risks, such as how a flood might disrupt supply chains or lead to public health crises (Eden & Gonzalez, 2022; Wright, 2021).

Despite the upfront costs, the economic case for mitigation remains overwhelmingly strong. Evidence consistently shows that for every dollar invested in mitigation, multiple dollars are saved in avoided disaster losses. This cost-benefit advantage becomes even more pronounced in the face of increasing climate-related risks, urbanisation, and

population growth in hazard-prone areas. Proactive mitigation not only breaks the cycle of repetitive destruction and rebuilding but also strengthens the long-term sustainability of development efforts. Moreover, it creates opportunities for innovation in resilient design, green infrastructure, and community-based monitoring systems (Davis & Fred, 2020; Kumar et al., 2021).

Lastly, the global nature of disaster risk necessitates strong international cooperation. Transboundary hazards—such as pandemics, climate change, and river basin floods—require collaborative mitigation frameworks to address these challenges. International agreements, such as the Sendai Framework for Disaster Risk Reduction, emphasise the importance of shared responsibility, knowledge transfer, and technology exchange. Through global partnerships, countries can access technical expertise, early warning systems, and funding mechanisms that may not be available domestically. Particularly for low- and middle-income nations, such collaboration is vital to enhancing mitigation capacity and building resilience against future shocks (Meng et al., 2024).

Preparation Stage

The preparation stage in disaster management is a critical, proactive phase that sits between mitigation and response. Its primary objective is to strengthen the ability of communities, organisations, and governments to manage the onset of disasters effectively and minimise associated risks. This stage encompasses a range of coordinated activities aimed at building resilience, reducing vulnerability, and enhancing operational capacity to manage potential disruptions. Preparedness is not merely about

planning for disaster—it is about creating the systems, relationships, and capabilities required to withstand and recover from crises swiftly and efficiently (Masterson et al., 2014).

A core pillar of this stage is the design of disaster response strategies and action plans. This involves a multi-step process that includes identifying local risks, assessing vulnerabilities, and outlining resource needs and deployment protocols. Such planning ensures a community or organisation knows in advance what actions to take, who is responsible, and what resources are required. By integrating risk assessments and scenario-based planning, authorities can align their strategies with local hazard profiles and resource constraints, thereby optimising their response to potential risks. This level of detail ensures that when a disaster occurs, response efforts are swift, coordinated, and effective (Oloruntoba et al., 2018).

Another indispensable aspect of preparedness is infrastructure resilience. Ensuring the structural integrity and functionality of critical infrastructure—such as hospitals, roads, bridges, communication systems, and power grids—is fundamental to effective disaster management. Physical adaptations, such as elevating roads in flood-prone areas or constructing earthquake-resistant buildings, play a preventative role in minimising the damage caused by extreme events. These measures not only protect human lives but also reduce the long-term economic burden on governments and communities by limiting infrastructure loss and recovery costs (Drozdibob, 2020).

Stakeholder coordination is a cornerstone of effective disaster preparedness and response. Disaster management is inherently multi-sectoral, involving government agencies, humanitarian organisations, private sector actors, and local communities.

Coordination mechanisms such as joint planning committees, shared communication platforms, and predefined roles enhance interoperability and reduce duplication of effort. When stakeholders work collaboratively, they are better able to mobilise resources, distribute aid, and manage information during a crisis (Ardiansyah et al., 2024).

In today's digital era, Information and Communication Technology (ICT) has emerged as a transformative tool in disaster preparedness. Technologies such as Geographic Information Systems (GIS), satellite imaging, early warning systems, and artificial intelligence enable authorities to monitor hazards, predict disaster trajectories, and effectively communicate risk. These tools allow real-time data collection and analysis, supporting evidence-based decision-making and enhancing situational awareness for frontline responders and coordination centres (Ghadge, 2023; Siriwardena, 2022).

Equally important is training and capacity building, which prepare responders, volunteers, and civilians to operate under stress and uncertainty. Simulated drills, workshops, and community awareness sessions not only equip individuals with technical skills but also foster confidence, cohesion, and clarity in roles. This preparedness ensures that everyone—from emergency responders to community members—can contribute meaningfully during an actual disaster scenario (Mehri et al., 2022).

A well-prepared system must also include strategic stockpiling and protection of critical assets. These assets include life-saving supplies such as food, potable water, fuel, tents, medical kits, and sanitation materials. Identifying and securing these resources before a disaster ensures that communities are not caught unprepared when disruptions occur. Furthermore, locating warehouses in strategic areas and maintaining real-time inventory

databases can substantially reduce response times and improve aid effectiveness (Erbeyoglu & Bilge, 2020).

Moreover, pre-establishing partnerships with suppliers, logistics companies, and humanitarian actors strengthens operational readiness. These partnerships create a shared framework for joint decision-making, resource sharing, and rapid mobilisation. When stakeholders have pre-existing agreements or memoranda of understanding, emergency response efforts are faster, more efficient, and more equitable (Jayadi & Forslund, 2023).

The success of humanitarian operations also hinges on the design and integration of resilient supply chains. Effective supply chains ensure that resources are transported efficiently, reach the intended beneficiaries, and are utilised optimally. Preparedness efforts must therefore address logistics planning, demand forecasting, transport routing, and the coordination of last-mile delivery. Lean and agile supply chain models, which emphasise efficiency and adaptability, have shown significant promise in disaster contexts, particularly when customised to the specific phase of the disaster lifecycle (Upadhyay et al., 2020).

Ultimately, community engagement and public education play a crucial role in enhancing disaster resilience. Communities that understand the nature of local hazards, know evacuation routes, and are equipped with emergency contact information are more likely to act swiftly and protect themselves. Public information campaigns, participatory risk assessments, and school-based preparedness programs cultivate a culture of safety and collective responsibility. This engagement builds social capital and empowers individuals to become active participants in disaster risk reduction (Ghadge & Dani, 2015).

Response stage

The response stage in disaster management is a pivotal, high-pressure phase that is activated immediately after a disaster occurs. It involves the urgent deployment of personnel, resources, and infrastructure to save lives, reduce suffering, and prevent further damage. The need for rapid decision-making, resource mobilisation, and cross-sectoral coordination characterises this phase. The primary aim is to stabilise conditions and create a foundation for long-term recovery and resilience-building. Effective execution at this stage significantly reduces the severity of a disaster's impact on human health, livelihoods, and infrastructure (Barino et al., 2024).

At the core of this stage is humanitarian logistics, encompassing the planning, transport, warehousing, and distribution of essential goods such as food, clean water, medical supplies, and shelter materials. These logistical functions form the operational backbone of response activities, enabling aid to reach affected populations in a timely and organised manner. Humanitarian logistics also links the preparedness and response phases by transforming pre-disaster planning into actionable strategies during emergencies (Negi & Negi, 2020).

Relief distribution, one of the most visible aspects of disaster response, relies heavily on coordination among various actors, including government agencies, NGOs, international organisations, military forces, and private sector logistics providers. The complexity of aligning these stakeholders can be daunting, especially when communication infrastructures are damaged or when humanitarian needs outpace available capacity. Nonetheless, when inter-organisational cooperation is effective, it helps overcome access barriers, reduces service duplication, and ensures the equitable distribution of aid

(Khairuddin et al., 2022). To support such efforts, coordination mechanisms—such as joint operation centres and shared data platforms—are used to ensure that relief logistics are targeted, transparent, and timely (Sopha, 2022).

Within this complex coordination environment, the idea of coopetition—a blend of cooperation and competition—has emerged as a vital strategy for humanitarian organisations. Under coopetition, NGOs and agencies may compete for funding and recognition while still collaborating on logistics, information sharing, and service delivery. These dynamics foster innovation, leverage comparative advantages, and increase collective efficiency. Studies have found that trust and even calculated distrust play a role in enabling effective coopetition during crises, as organisations form temporary alliances to meet shared humanitarian goals (Schiffling et al., 2020).

The mobilisation of responders is another critical activity in the response phase. Rapid deployment of trained personnel—ranging from emergency medical teams and firefighters to volunteer networks—is essential for immediate impact assessments, rescue operations, and field triage. This responsiveness is most effective when underpinned by robust preparedness systems, including training exercises, pre-arranged deployment protocols, and resource inventories (Zain et al., 2023).

As the disaster unfolds, infrastructure repair and restoration become urgent needs. Disasters can disrupt roads, bridges, ports, and communication lines, severely hampering relief efforts. Restoring these critical infrastructures not only enables the continuation of aid operations but also accelerates the transition to recovery. Integrated models now focus on combining logistics and infrastructure repair planning for optimal relief distribution and system redundancy (Ransikarbum & Mason, 2021).

In this highly fluid environment, logisticians play a key role as enablers of disaster response. They manage the flow of goods, map supply chain routes, oversee warehouse operations, and coordinate last-mile delivery in challenging conditions. Their effectiveness depends not just on technical capacity but also on their ability to collaborate across agencies and adapt to real-time information and constraints (Cano-Olivos et al., 2022).

An important takeaway from recent research is the inseparable connection between preparedness and response. Prepositioned supplies, risk mapping, stakeholder training, and technology adoption directly shape the speed and effectiveness of the response phase. For example, simulation-based planning and real-time decision support systems are being increasingly used to bridge preparedness with real-world applications (Seraji et al., 2021).

Additionally, coopetition enhances disaster responsiveness by enabling organisations to divide labour, pool expertise, and share critical infrastructure. Governments and donors can further encourage this approach by offering performance-based incentives or resource access to coopetitive consortia (Fathalikhani et al., 2020). Such strategic alignments enhance both efficiency and accountability, particularly in high-pressure environments.

In conclusion, the response phase is not an isolated set of activities, but a complex, coordinated effort that integrates disaster preparedness, logistical agility, and inter-organisational coopetition. Its success relies on advanced planning, rapid deployment, infrastructure restoration, and the ability to work cooperatively in uncertain situations.

When these elements are harmonised, the response stage becomes a powerful lever in minimising disaster impact and ensuring swift societal recovery.

Reconstruction or recovery phase

The recovery or reconstruction phase is a pivotal element of the disaster management cycle, initiated once the immediate response phase subsides. It represents the beginning of long-term efforts to rebuild infrastructure, restore services, re-establish livelihoods, and regenerate community well-being. The primary aim of this phase is not only to restore the affected area to its pre-disaster condition but also to improve its resilience through the concept of “build back better.” This approach incorporates risk reduction measures into recovery to reduce future vulnerabilities. Recovery is not simply a technical or engineering process; it is a socially, politically, and economically complex endeavour that demands sustained engagement from government agencies, humanitarian organisations, private firms, and the affected populations themselves (Bahmani & Zhang, 2022).

Reconstruction is a multidimensional process, involving physical, social, economic, and environmental systems. The physical component includes the repair and rebuilding of critical infrastructure—such as housing, roads, bridges, schools, and hospitals—which serve as the backbone of community recovery. These assets are crucial for reestablishing everyday life and restoring access to essential services, including education, healthcare, and mobility. More than a logistical necessity, infrastructure restoration symbolises hope and recovery for affected populations, especially when designed with equity and inclusion in mind. Prioritising the needs of marginalised communities during reconstruction contributes to social justice and enhances the long-term resilience of these populations (Yang et al., 2024).

Social recovery is equally critical but often underemphasised. Disasters tend to disrupt community cohesion and weaken institutional trust. Restoring social systems requires targeted efforts to rebuild social capital and foster civic engagement. Establishing community hubs, organising cultural healing activities, and involving residents in reconstruction decision-making are all strategies that help promote inclusive recovery and empower those most affected by disaster impacts (Cosson, 2021).

Environmental rehabilitation is another core dimension. Many disasters—especially those linked to climate-related events—damage ecosystems, reduce biodiversity, and degrade critical natural resources, including soil, water, and forests. Recovery planning must therefore go beyond rebuilding and incorporate ecosystem restoration, hazard-informed land use, and green infrastructure. These actions not only support environmental sustainability but also reduce the risk of future disasters (Zhuang et al., 2024).

In dysfunctional humanitarian environments—marked by fragmented governance, corruption, and poor coordination—recovery is often delayed, inefficient, and inequitable. In such contexts, transparent decision-making, robust stakeholder engagement, and institutional accountability are essential for restoring trust and ensuring the effectiveness of aid. The mismanagement of recovery funds and exclusion of affected groups in planning can exacerbate existing inequalities and prolong recovery timelines (Ali & Mannakkara, 2024).

In this complex landscape, coopetition—the coexistence of cooperation and competition among humanitarian actors—can serve as a catalyst for improved recovery outcomes. Competing organisations, particularly NGOs, often rely on the same donor funding but can achieve operational synergy through joint ventures in logistics, knowledge sharing,

and infrastructure planning. Evidence suggests that when swift trust is developed between agencies, they can collaborate effectively even under high-stakes, resource-constrained settings (Schiffling et al., 2020).

Preparedness has a significant impact on the success of recovery operations. Regions with pre-developed contingency plans, trained recovery teams, and pre-positioned supplies tend to transition more effectively from emergency response to rebuilding. Embedding recovery mechanisms into preparedness frameworks allows institutions to act swiftly, prioritise resource allocation, and coordinate efficiently. Simulation-based planning and decision support systems have proven effective in streamlining this transition (Mohammadi et al., 2024).

Mental health and psychosocial support (MHPSS) is a frequently neglected but vital component of recovery. Disasters often lead to loss, trauma, and long-term psychological stress, particularly in vulnerable populations. Recovery programs must incorporate culturally sensitive counselling services, grief support, and social reintegration activities to promote individual and communal healing (Kartika & Laitupa, 2022).

Monitoring, evaluation, and adaptive learning are essential pillars of recovery. Post-disaster assessments—such as After-Action Reviews (AARs)—can identify gaps, measure impact, and guide continuous improvement of disaster strategies. These insights ensure that the lessons learned in one disaster can enhance preparedness and response for future events (Zhao & He, 2020).

Ultimately, recovery timelines are highly variable, influenced by the magnitude of the disaster, the political context, funding availability, and institutional preparedness. Some

communities may bounce back in months, while others—especially those in low-income or conflict-prone areas—require years or decades of sustained effort. In such settings, international cooperation plays an indispensable role, providing technical expertise, financial resources, and long-term policy support (Mushtaha et al., 2024).

The recovery phase is a complex intersection of preparedness, institutional capacity, coopetition, and governance quality. Navigating this stage effectively is essential not only for immediate restoration but for ensuring that communities emerge stronger, more equitable, and more resilient to future shocks.

Several studies on disaster management in Ghana highlight the multifaceted nature and recurring impact of both natural and man-made disasters. Awuah-Gyawu et al. (2019) and Bonye et al. (2011) emphasise that while natural hazards like floods and windstorms are everyday occurrences, unsustainable human activities often exacerbate these events. Ahadzie and Proverbs (2011) provide historical context, noting the growing vulnerability of urban areas since 1936, and advocate for a more refined and integrated risk management strategy. Across the literature, there is a strong consensus that preparedness and stakeholder coordination are essential to effective disaster management (Awuah-Gyawu et al., 2019). This aligns with Van Wassenhove's (2006) disaster management cycle, which frames disaster response through mitigation, preparedness, response, and recovery. Scholars such as Tay et al. (2022) and Altay et al. (2018) stress that mitigation reduces vulnerability and builds resilience, while others like Masterson et al. (2014) and Drozdibob (2020) underscore preparedness as foundational to an effective response. The response stage, as noted by Barino et al. (2024) and Khairuddin et al. (2022), is heavily reliant on logistics, stakeholder

coordination, and increasingly, coopetition strategies (Schiffling et al., 2020). Recovery efforts, according to Bahmani and Zhang (2022), must go beyond rebuilding infrastructure to include social cohesion, environmental restoration, and mental health support. Altogether, the literature calls for a proactive, systemic, and inclusive approach to disaster management that integrates technical planning, local knowledge, and inter-organisational collaboration.

2.2.3 Historical Evolution of Modern Disaster Management

Since the beginning of time, humanity has endured innumerable catastrophes. The complexity of disasters is increasing, and their catastrophic and detrimental impacts on people are intensifying (Barnes et al., 2019). This section references the evolutionary stages of disaster management. It is essential to recognise that this segment of the literature primarily focuses on tracing the evolution of disaster management and examining the various stages that have unfolded over time, beginning with the earliest phase. Sawalha (2023) posits that the current state of disaster management has undergone an evolution consisting of seven distinct phases.

Table 2.2: Phases of Disaster Management Evolution

Phase 1	**Phase 2**	**Phase 3**	**Phase 4**	**Phase 5**	**Phase 6**	**Phase 7**
Civil Defence Phase	Establishment of specialised disaster agencies	Disaster management as a planning process	Disaster management cycles(s)	Rise of resilience research	Community-based approaches	Internationalisation phase

(Source: Sawalha, 2023)

The first phase is the civil defence. Higher levels of cooperation between various parties and groups of individuals were evident in disaster management throughout the late 1950s and early 1960s, when this "Civil defence" strategy became widespread. However, civil defence was an after-the-fact response that was reactive, ad hoc, and impromptu. Consequently, catastrophe risk reduction methods have been largely absent from the literature and practice during this period in favour of post-event reaction and recovery (Bosher et al., 2021). Soon after, a new ideology known as civic protection emerged from the earlier concept of civil defence, which emphasised better-coordinated group activities (Anderson, 1969). However, civic defence and civil protection were led by the military and were primarily concerned with security, emergencies during disasters, and reducing military threats and damage (Durkee, 1968). For example, Handmer and Parker (1991) noted that in the United Kingdom, preparations for wartime emergencies had taken precedence throughout this period. As a result, much of the literature produced during this period had a predominant militaristic identity and a civil defence framework. "Emergency preparedness" was a frequent tactic for handling disasters in the United States. The United States of America, however, looked to be virtually alone in taking this different tack (Anna Maria College, 2022; Alexsander, 2002).

The second phase is the establishment of specialised disaster agencies. Natural disasters afflicted the United States throughout the 1960s. The Federal American method of catastrophe management was therefore re-examined. Therefore, several specialised agencies have been established, such as the Federal Preparedness Agency, the Federal Disaster Assistance Administration, the Defence Civil Preparedness Agency (DCPA), the Federal Insurance Administration, and the National Fire Prevention Control Administration

(Schroeder et al., 2001). In addition, the United Nations General Assembly founded the United Nations Development Programme (UNDP) that same year. The United Nations Development Programme (UNDP) has made it one of its specialities to help disaster-prone nations strengthen their ability to withstand the effects of climate change and natural disasters (United Nations Development Programme, 2022). The United States' situation was not different. During this time period, other countries' catastrophe agencies have also been established. In 1974, Australia founded the Natural Disasters Organisation (Jones, 2007). Later, "Emergency Management Australia" (EMA) was established after a re-evaluation of the NDO's aims and structure. EMA prioritises flooding, bushfires, tropical cyclones, and other natural disasters in addition to the more general dangers addressed by the Commonwealth's Civil Defence Organisation. This significant change in methodology was a driving force behind the modern disaster management study, enabling experts to expand the field's practical and theoretical understanding. Research on disasters began to take on a more "civilian" character in the late 1960s and early 1970s, when its focus shifted away from military concerns and a growing number of natural and man-made disasters were included.

The Phase Three is the planning process. In the mid-1970s, a shift toward a process-oriented perspective emerged in disaster management. This approach involved a series of sequential steps, in contrast to previous approaches that placed excessive emphasis on preparedness as the primary aspect. These steps comprised what would later be recognised as the two distinct phases of a disaster: the pre-disaster and post-disaster stages. The emergence of empirical evidence in support of this viewpoint has led to the development of disaster management as a systematic approach that encompasses a

series of pertinent measures both before and after an event. Quarantelli's research, conducted during this period and the following years, was widely regarded as seminal in the field (Quarantelli et al., 1979). The stages preceding and following a disaster were characterised by more focused and structured endeavours, prioritising the actions to be taken before and after the occurrence. According to He´mond and Robert (2012), there has been a transition from short-term, reactive disaster responses to long-term, proactive, and development-oriented initiatives. According to Darjee et al. (2023), at the organisational level, there is a growing trend towards cross-functional disaster recovery planning. This approach involves incorporating input from all levels of management and departments within the organisation. Consequently, the literature no longer regards disaster planning as a spontaneous reaction to significant incidents, but rather as a process that incorporates foresight.

Phase Four is the Disaster Management Cycle. The number of natural disasters worldwide reached its peak in the late 1970s. The idea of DMC became more fully formed in the 1970s and 1980s. When compared to previous methods, the DMC seems to be more feasible overall (Vandemeulebroecke et al., 2023). There have been numerous DMC iterations. There have been a variety of proposed disaster recovery cycles, with stages ranging from the three described by Holloway (2003)—pre-disaster, during, and post-disaster—to the six described by Baird et al. (1975)—reconstruction, mitigation and prediction, preparedness for relief, warning, relief, and rehabilitation. Researchers and emergency managers alike found help in the cycle(s). Researchers have used the Disaster Management Checklist (DMC) to standardise and catalogue disaster outcomes, and by disaster managers to structure their operations (Wang et al., 2023). During their

1977 discussion of the DMC model, Kates and Pijawka highlighted its four stages: emergency, restoration, reconstruction and replacement, and development. A significant amount of work has been done with this model (Sobhaninia and Buckman, 2022). *The phase Five is the rise of "resilience' research.* The idea of resilience underwent more explicit development in the 1990s, incorporating personal, organisational, and social attributes/aspects. Several significant contributions to the discipline during this time may be seen in the work of Paton et al. (2000), Adger (2000), Horne and Orr (1998), and Blaikie et al. (1994). The polar opposite of vulnerability is resilience. According to Blaikie et al. (1994), vulnerability is the degree to which communities or organisations are susceptible to suffering the adverse effects of significant incidents. The ability of a community or an organisation to withstand the adverse effects of substantial incidents and survive in their environment is referred to as resilience. Within the context of an organisational setting, resilience was defined by Mallak (1998a) as "the capacity of an organisation to rapidly design and implement positive adaptive behaviours matched to the immediate situation, while enduring minimal stresses." Much other research, including that of Rosenthal and Kouzmin (1996) and Mallak (1998b), has been conducted to explore additional facets of resilience during this time. The terms "resilience" and "disaster" have become increasingly used in conjunction with each other during this phase, particularly in projects and the built environment (Sinha and Ola, 2021). The study of resilience has many applications in real life. For instance, the Australian government declared the National Recovery and Resilience Agency. When working with affected communities, governments, and industry, the Agency combines its expertise in natural disaster response and resilience. The Australian government also founded the Australian

Institute for Disaster Resilience (AIDR). Through leadership, professional growth, and knowledge exchange, AIDR seeks to improve disaster resilience (Emergency Management, 2022). Today, research on resilience is still developing and becoming more diverse, particularly when it comes to organisational, societal, and environmental crises.

The phase Six is the Community-based approach. The role of disaster management has evolved as a result of the previous phase of resilience and complexity, becoming more akin to a central node in a larger network that distributes and shares. It disseminates information and resources about disasters, rather than a central authority or centralised mechanism (Wang et al., 2022). In the late 1990s and early 2000s, this viewpoint significantly motivated the need for community-based disaster management methods (Moghaddam et al., 2022). The establishment of more practical mechanisms specifically suited to the needs of society is made possible by a society with higher levels of public awareness, as such a society can demonstrate higher levels of participation in identifying resources, conducting vulnerability assessments, assessing capacity, and developing coping mechanisms (Bali, 2022). Community-based approaches emphasise residents who should serve as the first line of defence in disaster management and who are better equipped to identify their own needs and goals because catastrophes directly impact them. As a result, multisector collaboration has increased in popularity in the field of catastrophe management since the turn of the 20th century (McNabb & Swenson, 2022). Community-based solutions, according to Leach et al. (2025), "put greater emphasis on what communities can do for themselves" and thus lead to the adoption of bottom-up disaster risk management strategies. The community's function in this instance changes from victim to partner in programme conception and execution. Nonprofit organisations

have developed these strategies as a means of strengthening resilient communities in their attempts to manage disasters. Numerous non-governmental organisations (NGOs) and international groups, such as the International Federation of Red Cross and Red Crescent, have previously employed community-based initiatives in various developing nations (Idriss-Wheeler, 2024). Consequently, over this period, a substantial body of research on community-based disaster management strategies has been created.

Phase seven is the internationalisation of practice. Different worldwide frameworks and standards for disaster management have been created and widely used since the early 2000s. The initiative for global implementation was taken by the HYOGO Framework for Action (2005-2015). The "Major Incident Management" approach has been theoretically developed to help people cope with disasters (Moore and Lakha, 2006). The BS12999:2015 (Damage Management- Code of Practice), ISO22320:2011 (Social Security - Emergency Management - Requirements for Incident Response), and BS65000:2014 (Guidance on Organisational Resilience) are only a few of the pertinent international standards that have been introduced. To provide a more precise "global roadmap" and a "code of practice" to minimise catastrophe casualties and boost resilience, the Sendai Framework for Action (2015-2030) was later introduced. According to Wolbers et al. (2021), this period witnessed a significant increase in the number of new scholars entering the field, mainly due to the 9/11 attacks in the USA, the 2004 Indian Ocean tsunami, and Hurricane Katrina in 2005. The authors found that throughout this stage, exploratory studies on disasters were the predominant type. The first ten years' worth of articles (2001–2010) used survey, document analysis, and interview/observation methodologies equally. The utilisation of interviews and observations changed in the

second decade (2011–2020), highlighting the importance of field research after disasters. Research on incident command, teamwork, crisis communications, and social media also received increasing attention during this time. During this time, Business Continuity Management evolved into an all-encompassing strategy that superseded its predecessors, including Crisis Response, Continuity Planning, and Disaster Recovery Planning (Fares et al., 2022). Since 2001, there has also been a greater emphasis on terrorism prevention, both practically and theoretically, as a significant contributor to disasters. Since the 2004 Indian Ocean Tsunami, when it became clear that the period immediately following a tragedy is an ideal opportunity to make beneficial and constructive changes in a community, the concept of 'Building Back Better' (BBB) has evolved and gained popularity (Building Back Better, 2022). Last but not least, it must be emphasised that these phases did not develop independently or in a detached manner; instead, they overlapped and represented a continuous flow of logical and significant evolutionary research and practice that has been influencing the field of disaster management over time.

The evolution of disaster management has been shaped by the increasing complexity and impact of catastrophes on human societies (Barnes et al., 2019). Sawalha (2023) outlines seven distinct phases in this evolutionary trajectory, beginning with the Civil Defence phase, which was essentially militaristic and reactive in nature (Bosher et al., 2021; Handmer & Parker, 1991), and later transitioning into the establishment of specialised disaster agencies, such as FEMA and UNDP, which signalled a shift toward institutional responses to both natural and man-made disasters (Schroeder et al., 2001; Jones, 2007). The planning phase in the mid-1970s marked a methodological turn toward

proactive, systematic disaster preparedness, influenced heavily by Quarantelli's seminal work (Quarantelli et al., 1979; Hémond & Robert, 2012). This was followed by the widespread adoption of the Disaster Management Cycle (DMC) in the late 1970s and 1980s, which helped structure both academic research and field operations through staged models of pre-, during, and post-disaster actions (Baird et al., 1975; Kates & Pijawka, 1977; Sobhaninia & Buckman, 2022). The rise of resilience research in the 1990s introduced concepts of adaptive capacity and vulnerability, reshaping disaster discourse around community and organisational robustness (Blaikie et al., 1994; Paton et al., 2000; Mallak, 1998a). This laid the groundwork for the community-based approach, which emphasised bottom-up participation, local knowledge, and the central role of residents as first responders and co-designers of risk strategies (Wang et al., 2022; Leach et al., 2025; Idriss-Wheeler, 2024). Finally, the internationalisation of disaster management emerged with the proliferation of global standards and frameworks, such as the Hyogo and Sendai Frameworks, promoting cross-border collaboration, institutional resilience, and the concept of "Building Back Better" (Wolbers et al., 2021; Building Back Better, 2022). These phases, though sequentially presented, are not mutually exclusive and have evolved as overlapping and interdependent layers of knowledge and practice that continue to shape the modern landscape of disaster risk management.

2.2.4 The context of Ghana

This section discusses some of the disaster management organisations in Ghana. This aims to provide context for disaster management in Ghana.

2.2.4.1 National Disaster and Management Organisation (NADMO)

The National Disaster Management Organisation (NADMO) is the Ghanaian government's principal agency responsible for disaster management across the country. It was established by an Act of Parliament in 1996 with the primary objective of coordinating national efforts in disaster prevention, preparedness, response, and recovery (Oteng-Ababio, 2013). NADMO is led by a Director-General, appointed by the President of Ghana with the advice and consent of Parliament. The Director-General is responsible for overseeing the day-to-day operations, as well as managing the organisation's strategic planning, budgeting, and allocation of resources. The organisation is guided by a board of directors, which provides overall policy direction (Apanga et al., 2017).

To ensure decentralised operations, NADMO maintains regional offices in all 16 regions of Ghana. Each regional office is managed by a Regional Coordinator appointed by the Director-General. These coordinators are responsible for coordinating disaster management activities in their respective regions, working in collaboration with local authorities and communities to address region-specific risks (Amutty, 2020).

One of NADMO's key functions is disaster prevention and risk assessment. This involves conducting hazard mapping and vulnerability assessments to identify areas at risk and to develop suitable mitigation strategies (Djimesah et al., 2018). The organisation also plays a significant role in preparedness and early warning. It enhances early warning systems, conducts community education, organises emergency drills, and provides training to increase community resilience (Ferrer Conill & Uppal, 2016).

When disasters occur, NADMO is the central coordinating body for emergency response activities, including evacuations, search and rescue missions, and the distribution of relief

supplies. However, studies have highlighted persistent challenges, such as delayed response times and shortages of essential supplies, which are often attributed to funding constraints and limited inter-agency coordination (Owusu-Kwateng et al., 2017). In the recovery phase, NADMO conducts damage assessments and coordinates aid delivery to affected communities. While communities consistently recognise NADMO as the lead responder, their evaluations of its effectiveness—particularly in terms of timeliness and appropriateness of support—are mixed (Apanga et al., 2017). In addition to operational activities, NADMO engages in research, advocacy, and public education. It collaborates with academic institutions and governmental agencies to promote disaster risk reduction awareness. However, there are still gaps in integrating disaster risk education into formal school curricula and providing adequate training for educators (Apronti et al., 2018).

Despite its broad mandate and nationwide reach, NADMO faces several enduring challenges. Resource constraints and political interference continue to undermine operational effectiveness (Anab et al., 2022). Furthermore, a lack of inter-agency collaboration often results in fragmented responses to disasters (Akoriyea, 2016). In rural areas, effective communication is hampered by low trust in government institutions, necessitating the use of traditional leaders as intermediaries to build trust and disseminate information (Ferrer Conill & Uppal, 2016).

In conclusion, NADMO serves a vital function in Ghana’s disaster management framework. However, to fully realise its mission, it must overcome systemic issues such as limited funding, weak inter-agency coordination, and gaps in community engagement and education.

2.2.4.2 Ghana Police Service

The Ghana Police Service (GPS) is the primary law enforcement agency in Ghana, responsible for maintaining public order and safety, enforcing laws, and preventing and investigating crime. Established in 1894, the Ghana Police Service operates under the authority of the Ministry of the Interior. It is headed by the Inspector General of Police (IGP), who is appointed by the President with the advice and consent of Parliament (Ansah-Koi, 1987).

The Service is structured into various specialised departments, including the Criminal Investigations Department (CID), the Special Weapons and Tactics (SWAT) Unit, the Motor Traffic and Transport Department (MTTD), and the Marine Police Unit. These departments enhance the operational capacity of the Service to address diverse security challenges across the country (Mensah & Ennin, 2019). The GPS operates in all 16 regions of Ghana with an estimated workforce of over 35,000 personnel. It collaborates closely with other security and emergency response institutions, such as the National Disaster Management Organisation (NADMO), to ensure coordinated response to both routine and emergency events, including natural disasters (Akoriyea, 2016; Christensen & Edu-Afful, 2019).

During natural disasters such as floods or earthquakes, the police play a vital role in maintaining public order, supporting evacuation processes, and ensuring the safety of both the affected population and emergency responders. Their presence is essential in preventing looting, directing traffic, and securing disaster zones (Anku-Tsede et al., 2018). Beyond response, the Ghana Police Service is involved in disaster risk reduction by participating in public education campaigns and working with NADMO to raise awareness

on disaster preparedness. This includes promoting early warning systems and educating communities on safety practices (Owusu et al., 2021).

In recent years, the GPS has increasingly integrated technology into its operations, improving communication, surveillance, and real-time data sharing. Innovations like the use of mobile data terminals and community-level surveillance tools have enhanced policing and public safety, although gaps remain in infrastructure and training (Nweke & Francis, 2024). Despite its broad mandate, the Service faces challenges including resource limitations, public trust deficits, and logistical constraints during emergency operations. Political interference and outdated training curricula have also been cited as barriers to performance improvement (Dzordzormenyoh, 2024; Serra, 2023).

2.2.4.2 Ghana National Fire Service

The Ghana National Fire Service (GNFS) is a state agency responsible for fire prevention, protection, and firefighting services in Ghana. Established by an Act of Parliament in 1997, the GNFS's primary mandate is to prevent and manage fires across the country. Beyond firefighting, the Service plays a key role in national disaster management efforts (Amoako & Frimpong, 2021). The organisation is headed by a Director-General, appointed by the President of Ghana, who oversees strategic planning, budgeting, and resource allocation. The Board of Directors provides policy direction and governance oversight (Bosu, 2014).

GNFS operates regional offices in all 16 regions of Ghana, with each office headed by a Regional Commander. These commanders are tasked with coordinating fire safety and disaster management activities within their regions and liaising with local stakeholders

and community groups (Osei, 2022). In the context of natural disaster management, GNFS plays a critical role in responding to a variety of emergencies, including floods, earthquakes, and building collapses. Their work involves both firefighting and search and rescue operations, especially in urban environments where incidents such as structural failures and fire outbreaks are common (Nyame & Debrah, 2021).

The GNFS works closely with other agencies like the National Disaster Management Organisation (NADMO), NGOs, and private sector stakeholders to deliver coordinated emergency response. During natural disasters, GNFS is actively involved in evacuation, rescue, and emergency medical response (Aboagye et al., 2023). Its personnel are trained in urban search and rescue techniques and are equipped with modern tools to handle high-risk situations such as collapsed buildings, landslides, and hazardous material incidents (Ofori & Sam, 2020).

In addition to these operational duties, GNFS also carries out fire prevention and public education campaigns. The Service promotes fire safety awareness and community disaster preparedness through school outreach, public demonstrations, and stakeholder partnerships (Darko et al., 2020). These activities are designed to reduce fire risk, encourage responsible land use, and increase general knowledge on how to respond during emergencies. Despite its expanded role, GNFS faces several challenges, including limited logistics, staff shortages, and infrastructure deficits, particularly in rural areas. These constraints affect the speed and scope of their response, as documented in recent performance assessments (Tufuor, 2022).

2.2.5 The Role of Supply Chain in Disaster Management

The supply chain function remains a central pillar in disaster management operations, underpinning the planning, coordination, and execution of interventions across all phases of the disaster management cycle, particularly in the response and recovery stages. Numerous studies emphasise that approximately 80% of all disaster-related activities depend on the efficiency of supply chain systems, including logistics, procurement, inventory management, and last-mile distribution, particularly in volatile and resource-constrained environments (Anoop & Kumar, 2023).

Following catastrophic events such as the 2004 Indian Ocean Tsunami, interest in the role of logistics in disaster response dramatically expanded. Today, with increasing disaster frequency due to climate change, urbanisation, and conflict, the relevance of agile and resilient logistics coordination has never been greater. New research highlights the necessity of responsive logistical systems capable of adapting to dynamic, uncertain conditions where demand volumes, locations, and available infrastructure are constantly changing (Masoomi et al., 2023).

At its core, humanitarian logistics must deliver time-sensitive relief in the form of food, clean water, medical aid, sanitation supplies, temporary shelter, and other essentials. These resources must be procured, transported, and delivered rapidly in challenging conditions, such as blocked roads, power outages, and security risks. The capability of logisticians to execute under these constraints often defines the success or failure of relief efforts (Xu et al., 2023).

However, humanitarian supply chains also face operational complexities such as managing unsolicited donations, dealing with fragmented authority structures, and balancing compliance with flexibility. These challenges are magnified in dysfunctional humanitarian environments where poor coordination, corruption, and information asymmetry can hinder effectiveness. As a result, the need for transparent systems that support not only the physical movement of goods but also the flow of information and funds becomes critical (Iqbal & Ahmad, 2022).

Modern disaster logistics strategies also involve anticipatory planning through inventory prepositioning—the strategic stockpiling of supplies in vulnerable regions before an emergency. When combined with coordinated supplier networks and real-time data analysis, these approaches enhance the efficiency of last-mile delivery and reduce lead times, even in highly unpredictable scenarios. For instance, multi-level relief supply models that incorporate local warehouses, regional distribution hubs, and mobile units have been shown to improve cost-effectiveness and responsiveness significantly (Moghaddam et al., 2023).

An essential element in this system is inter-agency cooperation, often operationalised through the concept of “coopetition”—a blend of collaboration and competition among NGOs, governments, and private sector actors. While these actors may compete for donor funding or recognition, successful missions depend on shared logistics infrastructure, joint assessments, and harmonised data flows. The cooperative aspect of this relationship ensures optimal resource utilisation and prevents duplication, while the competitive edge fosters innovation and efficiency (Witkowski & Marcinkowski, 2022).

Beyond traditional supply operations, disaster logistics now increasingly encompasses the management of human capital, including volunteers and first responders. Scenario-based logistics models simulate various crises to allocate resources dynamically, prioritise triage areas, and match volunteer skills with operational demands. These tools enhance the ability of humanitarian agencies to act with precision and speed (Vosooghi et al., 2022).

Technology also plays a transformative role. Digital platforms, GPS tracking, drones, blockchain, and data analytics are being integrated into humanitarian logistics to improve visibility and accountability across the supply chain. These systems also help counteract corruption and inefficiencies by enabling real-time monitoring and audit trails for deliveries, especially in high-risk or politically unstable regions (Iqbal & Ahmad, 2022).

In conclusion, the humanitarian supply chain is no longer a support function—it is a core strategic asset in disaster management. By embedding principles of preparedness, coopetition, transparency, and adaptability, modern logistics frameworks empower stakeholders to act decisively and equitably in the face of increasing global disasters. Through collaborative innovation and agile response mechanisms, humanitarian logistics can truly serve as the operational backbone of effective disaster relief.

Integrating these insights, it becomes evident that disaster logistics is not an isolated operational concern but a multidimensional system deeply embedded in the broader disaster management architecture. The planning and delivery of emergency services by frontline institutions such as the Ghana National Fire Service (GNFS), Ghana Police Service (GPS), and the National Disaster Management Organisation (NADMO) depend significantly on the reliability and agility of supply chain mechanisms, especially during

high-impact events like floods, fires, or structural collapses (Aboagye et al., 2023; Amoako & Frimpong, 2021; Dzordzormenyoh, 2024). The effectiveness of these agencies hinges on logistics frameworks that can support time-critical interventions, deploy trained personnel, and manage the flow of life-saving equipment and supplies to hard-to-reach communities (Xu et al., 2023; Ofori & Sam, 2020). The integration of anticipatory tools such as inventory prepositioning, coordinated multi-agency planning, and digital technologies like GPS and real-time data analytics serves as a force multiplier in overcoming contextual challenges, including blocked access routes, fragmented authority, and information lags (Masoomi et al., 2023; Iqbal & Ahmad, 2022). Moreover, the operational success of emergency agencies is increasingly reliant on “coopetition” strategies that enable resource sharing among stakeholders without undermining institutional autonomy (Witkowski & Marcinkowski, 2022). Thus, the intersection of institutional capacity, logistics resilience, and inter-organisational cooperation forms the foundation of effective disaster response and recovery, reinforcing the need for supply chains to be viewed as both strategic and humanitarian assets within national and international disaster governance systems.

2.2.6 The actors/ players engaged in the Supply chain for Disaster Management

Actors in the supply chain comprise various groups and individuals who participate in and contribute to humanitarian logistics and disaster management (Negi & Negi, 2021). Governments, NGOs, police, aid agencies, logistics service providers, financial institutions, private sector organisations, donors, the Red Cross, and the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) are all examples of stakeholders in disaster management. The actors, according to Balcik et al. (2010),

include host governments, the armed forces, regional and international relief groups, as well as private sector companies, each with its own interests, mandates, capacities, and skills. Such actors respond to major humanitarian crises by providing aid to affected communities, including food, water, and non-food essentials such as shelter (Kim et al., 2019; Banomyong et al., 2017; Oloruntoba et al., 2016). For the humanitarian logistics plan to be successful and cost-effective, each actor has a crucial role to play. Humanitarian aid supply chain coordination among participants impacts the success or failure of a relief operation.

Achieving shared objectives requires cooperation and trust among participants in humanitarian supply chains, given the gravity and complexity of the situation, as well as the limited resources available (Dubey et al., 2019a). A lack of coordination among actors in the humanitarian supply chain can result in significant losses and inadequate responses in affected areas (Dubey et al., 2018). The roles played by each actor in supply chain management are outlined in the section below.

The government is responsible for initiating and authorising tasks, as well as mobilising assets (Behl & Dutta, 2019b; Banomyong et al., 2017; Dubey et al., 2019a; Ganguly & Rai, 2016; Quarshie & Leuschner, 2020; Zhang et al., 2020). The military plays a crucial role in the process above, as its soldiers provide essential assistance to the affected individuals and contribute to the overall functioning of the operations. The primary functions of the military within relief supply chains encompass security and safeguarding, distribution, and engineering. In addition to the activities above, the military also provides essential assistance, including establishing encampments and medical facilities, repairing

transportation infrastructure, and offering telecommunication services (Banomyong et al., 2017; Behl & Dutta, 2019a; Dubey et al., 2019a; Quarshie & Leuschner, 2020).

In contrast, the police are responsible for establishing safe routes for rescue operations. The relocation of all vehicles to designated parking areas and the Implementation of traffic control measures. Dubey et al. (2019a) assist in the management and mitigation of disasters, as well as in salvage operations and related activities.

Medical aid agencies offer humanitarian assistance, specifically emergency relief operations in reaction to natural disasters (Bealt et al., 2016; Behl & Dutta, 2019a; Dubey et al., 2019a; Ganguly & Rai, 2016). Logistics service providers play a crucial role in efficiently overseeing the physical distribution of products within the humanitarian supply chain during relief operations (Behl & Dutta, 2019a; Dubey et al., 2019a; Kim et al., 2019). Zhang et al. (2020) assert that the financial sector, particularly banks and insurance companies, plays a crucial role in disaster situations and their integration within the humanitarian supply chain. Their primary contribution lies in providing financial resources during the response and rehabilitation phases.

According to Quarshie & Leuschner (2020), donors are individuals who provide financial resources to support humanitarian initiatives fully. Behl and Dutta (2020) and Dubey et al. (2019a) have emphasised the importance of donor and provider responsibilities in facilitating humanitarian processes within NGOs, both at local and international levels. According to Zhang et al. (2020), donors provide monetary assistance to enhance humanitarian endeavours. According to Behl & Dutta (2019a), collectors are responsible for gathering funds from suppliers, employees, and customers to support organisational activities. The provider refers to an entity that offers complementary goods and services.

According to Dubey et al. (2019a), humanitarian organisations, such as the Red Cross, are essential contributors to the supply chain, as they provide emergency aid, disaster relief, and disaster preparedness education on a global scale. In contrast, Dubey et al. (2019a) have asserted that the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) assumes the responsibility of coordinating worldwide emergency response efforts aimed at preserving lives and safeguarding individuals during humanitarian crises. The primary objective of this initiative is to enhance the global response to complex humanitarian crises and natural disasters. This aligns with the research conducted by Awuah-Gyawu et al. (2019), which examined the involvement of supply chain actors in disaster management within the Ghanaian context. The study conducted by the authors revealed that the key stakeholders involved in disaster management in Ghana include the National Disaster Management Organisation (NADMO), Ghana National Fire Service, Ghana Police Service, military, Ghana Ambulance Service, logistics companies, international organisations such as the Office for the Coordination of Humanitarian Affairs (OCHA), and non-governmental organisations (NGOs).

Bonye and Godfred (2011) demonstrated that in instances of disaster, the study communities have typically received relief support from formal institutions. The forms of support encompass various aspects, including sustenance, resources, pharmaceuticals, temporary housing, and monetary aid. In contrast, Chari et al. (2021) have substantiated the significance of cooperation in the management of humanitarian supply chains. This collaborative approach enables humanitarian actors to effectively deliver essential resources, including shelter, clothing, and basic water and sanitation, to individuals

affected by cyclones. The study's findings indicate that collaboration among governmental entities, humanitarian organisations, non-governmental organisations (NGOs), and the private sector played a crucial role in enhancing the efficiency and efficacy of humanitarian efforts within the supply chain. The ability to effectively distribute relief supplies, such as tents, water containers, water purifiers, plastic sheets, tarpaulins, and generators, is crucial for humanitarian personnel to assist a large number of affected individuals.

Moreover, the research conducted by Rasyidi & Kusumastuti (2020) revealed that the inclusion of various types of collaboration, both horizontal and vertical, throughout the humanitarian supply chain facilitated the identification of the most crucial requirements. It has been revealed that during the initial stages of relief operations, personnel relied on Econet Wireless for the use of drones to assess the magnitude of the humanitarian crisis in the region. Subsequently, they possess the capacity to ascertain the appropriate assistance to provide to the impacted areas. The military made significant contributions by utilising their helicopters to evaluate the extent of the aid required and transport essential supplies to areas of utmost importance. Extensive collaboration can also result in load consolidation, which entails the utilisation of full truck loads, leading to fuel savings.

According to Chari et al. (2021), the authors found that implementing cooperative strategies within the supply chain resulted in the mitigation of non-value-added activities. The participants provided evidence that the operation experienced significant benefits as a result of collaborating with the army and the police. The security personnel were protected during transportation. It ensured the safety of inventory within warehouses,

thereby mitigating losses resulting from theft, a common occurrence in other aid distribution processes.

The effectiveness of humanitarian logistics hinges on the interplay of a complex network of actors—ranging from governments and military forces to NGOs, donors, logistics service providers, and international organisations—each with distinct roles, resources, and mandates (Negi & Negi, 2021; Balcik et al., 2010; Awuah-Gyawu et al., 2019). The literature consistently underscores that no single actor can manage disaster response alone, and the success of relief efforts often depends on how well these diverse stakeholders coordinate (Dubey et al., 2019a; Chari et al., 2021). National actors such as the Ghana Police Service, Ghana National Fire Service, military, and NADMO serve as frontline responders by securing logistics routes, conducting rescue operations, and facilitating resource mobilisation (Awuah-Gyawu et al., 2019; Bonye & Godfred, 2011). At the same time, international organisations like OCHA and the Red Cross contribute global experience, funding, and supply chain expertise to ensure that essential aid—including shelter, food, water, and medical supplies—reaches affected populations efficiently (Dubey et al., 2019a; Kim et al., 2019). As humanitarian crises increase in frequency and complexity, coordination becomes even more critical. Poor communication, fragmented authority, and lack of trust among actors can severely compromise the speed and impact of relief efforts (Dubey et al., 2018; Behl & Dutta, 2019a). Research highlights that inter-agency cooperation—whether vertical (across organisational levels) or horizontal (across peer organisations)—improves need assessment, enables load consolidation, enhances security, and reduces operational waste (Rasyidi & Kusumastuti, 2020; Chari et al., 2021). Moreover, collaborative strategies like joint assessments, shared logistics hubs, and

aligned funding cycles have been shown to mitigate non-value-added activities and increase the safety and traceability of humanitarian inventory (Zhang et al., 2020; Quarshie & Leuschner, 2020). Thus, actors in the humanitarian supply chain must not only fulfil their individual mandates but must also align through trust-based partnerships and integrated logistics planning to ensure that limited resources produce maximum humanitarian impact.

2.2.7 Challenges in the Supply Chain for Disaster Management

Behl & Dutta (2019a) and Jabbour et al. (2019) researched the chosen contemporary literature related to logistics and supply chain management in the humanitarian sector. The authors identified several research gaps and proposed a research agenda for future studies. It was determined that the majority of the studies are theoretical, with authors discussing a variety of topics about disaster types, humanitarian organisations, phases of disaster relief, and disaster localisation. All of these investigations were primarily concerned with logistics management.

Shafiq & Soratana (2019) also conducted a literature review and identified opportunities for future development in the logistics and supply chain management of humanitarian organisations. The authors investigated the logistics of humanitarian organisations in terms of efficacy and effectiveness. In addition to discussing the logistics and supply chain in disaster relief operations, Dubey et al. (2019b) highlighted the literature from the past, present, and future.

Numerous researchers have addressed various logistical issues and challenges related to humanitarian aid. John and Ramesh (2016) conducted a study in the Indian context, using interpretive structural modelling techniques, and identified the barriers to

humanitarian logistics and their impact on the functioning of the humanitarian supply chain. Ganguly and Rai (2016) addressed disaster challenges and issues in Uttarakhand, India, noting issues such as resource storage and mobility. On the other hand, it was discovered that collaboration between the government, aid agencies, foreign and local NGOs, local administration, and the armed forces was a key factor in the dissemination of technology.

Similarly, Chari et al. (2020) identified problems with storage facilities during Cyclone Idai relief operations in Zimbabwe. The majority of potential storage facilities in the affected districts were severely damaged. Additionally, there was a shortage of mobile storage containers to support the rescue teams as they moved throughout Chimanimani and Chipinge. John & Ramesh (2012) attempt to identify some vulnerabilities by analysing the current scenario for disaster management and propose a few solutions to close the identified gaps. An SAP-LAP model was used in the study to characterise the managerial issues in humanitarian supply chain management. Identifying the supply source, the significance of the central authority, coordination between participants, disaster management supply chain awareness, the role of the supply chain professional, resource scarcity, and the need for financial flow in a supply chain are all issues that must be considered.

Pathirage et al. (2012) also conducted a study on identifying the challenges in the humanitarian supply chain, discovering that several factors, including managerial/operational, environmental, legal, technological, social, and economic factors, have a direct impact on the disaster management cycle, while political and institutional factors have an indirect effect. Lack of training and awareness-raising

programmes, limited funding for economic planning procedures, inadequate detection and warning systems, the need to update disaster-related laws regularly, the requirement for effective education, poor planning, insufficient communication, ineffective leadership, and insufficient institutional planning were cited as key challenges.

Joshi (2010) cited the need for adequate storage facilities, the inadequacy of supply chain management software and communication apparatus, the difficulty of obtaining government clearance, and communication as obstacles that World Vision, India, faces in humanitarian logistics. Huge distances, population density, unreliable information and communication flow, and coordination were identified as the most significant obstacles.

In Ghana, Awuah-Gyawu et al. (2019) found that the coordination of stakeholders has no positive effect on effective disaster preparedness when viewed as an isolated construct. This is because, if the necessary resources are not provided, stakeholders in disaster management may become increasingly demotivated and frustrated as they are exposed to greater risks, which can exacerbate the disaster's impact. Again, it was found that disaster planning alone has no significant effect on effective disaster preparedness, as ineffective implementation of plans due to inadequate resource management and coordination of stakeholders may render the objectives of effective disaster management unachievable.

Despite the preceding, several studies have demonstrated that significant administrative obstacles exist within the working structure of disaster management, which can hinder its effectiveness. Dwivedi et al. (2018) stated that even though members participating in disaster management operations are pretty competent, administrative issues lead to the formation of negative attitudes, which has a subversive effect on their behaviour.

Therefore, to maximise employee potential, it will be necessary to design clear career advancement paths. Thus, all forms of political influence and lack of transparency must be eradicated. According to the findings of Dwivedi et al. (2018), overlapping job descriptions of employees from organisations participating in disaster management are a significant source of administrative conflict. All employees involved in the emergency supply chain should have their roles and responsibilities clearly outlined and be incentivised to improve their performance through a range of incentives. Coordination systems should be explicitly defined in the disaster management organisation chart at all levels. The authority of various officers should be founded on their involvement and responsibility within the emergency supply chain. Specifically, for greater efficiency, the delegation of appropriate authority to government officials and their assigned duties should be verified. Given that DRROs (government offices responsible for disaster management) receive specialised training on relief distribution and play a crucial role in district-level disaster operations, their authority and responsibility should be appropriately aligned.

Moreover, Dolinskaya et al. (2018) reported that the management of humanitarian organisations faces logistical challenges that are classified as external and internal factors. External challenges are obstacles outside the direct administration of humanitarian organisations. In terms of external barriers, laws and regulations are a significant concern for the humanitarian organisation. National regulations governing the importation of drugs are tightening, compelling organisations to acquire medications from local markets. To prevent the circulation of counterfeit and substandard products, humanitarian organisations must ensure that national suppliers adhere to World Health

Organisation (WHO) quality standards. In addition, competition between humanitarian organisations arises when the number of certified national wholesalers is insufficient to meet demand, resulting in increased product prices. Demand uncertainty is another external factor affecting humanitarian assistance. For instance, Dolinskaya et al. (2018) reported that during the Ebola response, the uncertain demand for PPEs had a significant impact on the decentralised supply chain. Some organisations were unable to establish new Ebola treatment centres due to a lack of protective gear for healthcare workers, due to the failure of PPE manufacturers to produce sufficient quantities.

In addition to external challenges, Dolinskaya et al. (2018) report internal challenges. These are managed immediately by the humanitarian office. Incompetence is an obvious example. Also affecting the efficacy of the humanitarian supply chain is the capability for rapid deployment. The medical aid provided in the days immediately following a natural disaster differs from the aid given after several weeks have passed. The chilly chain is an example of another internal difficulty. In cases where the cold chain requirements are not met, the quality of the pharmaceuticals can be severely compromised; therefore, temperature plays a crucial role in the transportation and storage of medications.

According to Sahebi et al. (2017), cultural context was recognised as one of the most significant obstacles in the humanitarian supply chain. In the context of disaster relief, therefore, acculturation and an enhanced level of people's culture are among the requirements that must be considered. The lack of cooperation and coordination among the involved parties earned a high ranking. This inter-organisational difficulty is linked to all four phases of disaster relief and is the most frequently cited in the literature. The organisations involved in relief operations should have practical cooperation with relief

aid suppliers to minimise time waste and expedite aid delivery. When involved parties are unfamiliar with one another's capacities, procedures, and duties, coordination is further hampered. Experts made the following recommendations to address this difficulty (Sahebi et al., 2017).

First, it is essential to establish an organisation or department as a command element for coordinating and synthesising the activities of all parties involved in humanitarian operations. Second, a collaborative approach to planning relief and rescue operations should be pursued through regular meetings among various stakeholders. Thirdly, disaster management organisations should establish long-term strategic alliances with suppliers to ensure the availability of sufficient relief aid at all times and in all locations. To coordinate the distribution of relief aid, the involved parties should enlist the assistance and advice of residents in the affected areas.

Unlike the preceding, Chari et al. (2020) reported that the lack of communications infrastructure after Cyclone Idai severely impacted the humanitarian relief supply chain. All NGO and government interviewees concurred that both telephone and Internet communications were disrupted, depriving affected individuals and humanitarian organisations of an efficient information flow. District Civil Protection Units affirmed that they lacked sophisticated communication tools, such as the Internet, to rapidly connect and communicate with other actors in the affected districts. The transfer of data between affected districts and national command centres was extremely sluggish. Due to the supply chain teams' reliance on unreliable data, the relief operations were executed improperly. In one instance, a government employee describes the difficulties of accessing victims in the districts of Chimanimani and Chipinge as follows: Due to a poor

communication network, there was a delay in assessing the needs and collecting the necessary data to ensure that our responses were effective and met the needs of the people. Following the cyclone, there was a risk of diseases such as dysentery and cholera in the afflicted areas, and aid arrived slowly due to a lack of communication tools.

The devastation of logistics infrastructures, particularly roads and bridges, across all Cyclone Idai-affected regions rendered many communities inaccessible, thereby disrupting supply chain routes. This hindered the delivery of food and medication and prevented access to safe sites. Muddy roads prevented vehicles from moving, delaying disaster response. Transport was a significant obstacle in assessing the victims' needs and delivering the desperately required aid. The road network was severely damaged by the cyclone and flooding, resulting in delays of several days in evacuating at-risk villagers and distributing urgently needed relief supplies. The bridge between the emergency response centre and the chronic care facility has collapsed.

Another significant barrier identified by Chari et al. (2020) was that bad weather during and after the cyclone disrupted efforts to deliver aid to affected victims via the supply chain. Due to the persistent rain and fog, aid delivery vehicles were stranded, as were aircraft. In interviews with respondents, bad weather was cited as a significant factor that impeded the delivery of humanitarian aid to Cyclone Idai victims in the districts of Chimanimani and Chipinge. In other words, the incessant rains made it difficult for supply chain actors to assess the humanitarian situation in the afflicted areas and deliver aid. Consequently, some families were stranded in the water for six days without sustenance before being rescued.

One other crucial obstacle in the humanitarian supply chain is the lack of financial resources. Interviews with key informants conducted by Chari et al. (2020) revealed that Zimbabwe's most significant supply chain risk during the Cyclone Idai relief operation was a financial deficit for the entire operation. This funding shortfall affected a range of activities, including the overall response planning and execution. IOM Shelter and NFI Cluster Team (2019) corroborated the impact of the economic climate on the availability of information to humanitarian actors. There was a deficiency in the Civil Protection Unit's (CPU) ability to provide accurate and up-to-date information, as the CPU lacked the necessary equipment, including laptops, airtime, and data recording devices.

An extensive body of literature confirms that while humanitarian logistics and supply chain management have become increasingly central to disaster response, the field still faces significant theoretical, operational, and infrastructural challenges that limit its impact. Numerous scholars note that despite the rising urgency and complexity of humanitarian crises, research in this field remains heavily theoretical, with limited empirical application to real-world disaster environments (Behl & Dutta, 2019a; Jabbour et al., 2019; Shafiq & Soratana, 2019). These gaps are compounded by recurring logistical barriers—such as poor storage, inadequate transport infrastructure, and limited technological integration—identified across global case studies, from India (John & Ramesh, 2016; Ganguly & Rai, 2016) to Zimbabwe (Chari et al., 2020). Inadequate communication infrastructure and lack of mobile storage capacity during crises like Cyclone Idai illustrate how fragile physical and digital networks can paralyse even well-intentioned humanitarian efforts. Moreover, coordination breakdowns among actors—whether due to overlapping roles, unclear responsibilities, or siloed operations—frequently undermine supply chain

efficiency (Sahebi et al., 2017; Dwivedi et al., 2018). The absence of strategic alignment and insufficient stakeholder motivation in contexts like Ghana demonstrates that planning alone does not equate to preparedness unless supported by adequate resources, transparency, and inclusive governance (Awuah-Gyawu et al., 2019). External constraints, such as regulatory bottlenecks and supply shortages—especially for medical goods—further disrupt humanitarian operations, as evidenced during the Ebola crisis (Dolinskaya et al., 2018). Meanwhile, internal challenges like limited cold chain infrastructure, cultural misunderstandings, and the failure to integrate local knowledge hinder the adaptability and responsiveness of humanitarian systems (Joshi, 2010; Sahebi et al., 2017). In response, several scholars propose structural improvements, including the establishment of unified coordination bodies, more precise job descriptions, strategic supplier alliances, and better-trained personnel to manage logistics under uncertainty (John & Ramesh, 2012; Pathirage et al., 2012; Rasyidi & Kusumastuti, 2020). Overall, the evidence reveals that despite increasing awareness of these challenges, humanitarian supply chains still require systemic reform—including institutional clarity, infrastructure investment, and contextual adaptation—to become truly resilient, responsive, and equitable in the face of disaster.

2.2.8 Coopetition

The contemporary literature on strategic alliances has evolved significantly in recent years, underscoring how value creation is increasingly dependent on the ability of organisations to pool, access, and deploy complementary resources across traditional organisational boundaries. No longer confined to bilateral partnerships or linear supply chains, modern interorganizational arrangements emphasise the importance of flexible,

multi-actor collaborations that can respond to dynamic needs. These strategic collaborations are especially vital in sectors characterised by complexity and volatility, such as humanitarian operations. Here, diverse entities—including governmental institutions, non-governmental organisations (NGOs), community-based groups, and private actors—collaborate to address social challenges, respond to emergencies, and deliver life-saving assistance under extreme time and resource constraints (Fathalikhani et al., 2020).

A key strategic concept gaining traction in this space is coopetition—the simultaneous enactment of cooperation and competition among organisations. Initially developed within commercial business ecosystems, the coopetition paradigm has been successfully applied to the nonprofit and humanitarian sectors, where competing organisations often must join forces to achieve collective goals while maintaining competition for limited funding, legitimacy, or beneficiary recognition (Schiffling et al., 2020). In humanitarian crises, this duality is not only familiar but also necessary. The shared imperative to save lives and alleviate suffering necessitates collaboration, yet the structural realities of resource scarcity, donor accountability, and visibility pressures sustain competitive undercurrents.

This tension between urgency and constraint creates a unique operational environment for humanitarian organisations—one characterised by rapid-onset events, weak institutional frameworks, and competing stakeholder interests. Coopetition offers a strategic framework for managing this environment. Crucially, it enables organisations to act swiftly and collectively even in the absence of long-standing trust. The emergence of “swift trust” and even “swift distrust,” as Schiffling et al. (2020) observe, enables

organisations to temporarily align for specific tasks, bypassing bureaucratic delays and facilitating more agile, mission-oriented collaboration.

Strategically, coopetition is increasingly modelled as a value-creating game where organisations negotiate mutual benefits while preserving their competitive edge. Vapola et al., as cited by Dowling (2020), describe it as a joint-value mechanism wherein actors must continuously balance cooperation for innovation and efficiency with the strategic appropriation of value. Building on this, Konyalıoğlu et al. (2024) use system dynamics and causal loop diagrams to reveal how coopetitive relationships are shaped by feedback loops, power asymmetries, and evolving needs, particularly within supply and logistics ecosystems. Their findings offer valuable insights for humanitarian supply chains, where actors must rapidly adapt to shifting circumstances while maintaining alignment on overarching objectives.

This hybrid model is also evident in humanitarian logistics, where organisations may share backend functions, such as storage, transportation, and procurement, while still competing on frontend dimensions, like public visibility and grant acquisition. (Goetz et al., 2022) Highlight the importance of trust, shared mindsets, and long-term commitment to sustain coopetitive value creation in these contexts.

In recent years, technology has emerged as a vital enabler of coopetition, particularly through platforms that support service-dominant logic (S-D logic), where value is co-created through the integration of resources and knowledge sharing, rather than unilateral action. (Silva & Cardoso, 2025) argue that digital infrastructures and institutional frameworks can act as stabilisers for coopetition networks, facilitating governance, real-time coordination, and equitable distribution of benefits among actors.

However, coopetition is not without risks. In dysfunctional humanitarian environments—marked by weak regulation, corruption, or misaligned incentives—coopetition must be carefully managed to avoid opportunism and ensure alignment with humanitarian principles. Here, the success of coopetition depends on developing robust governance models that can effectively monitor cooperation, manage tensions, and enforce accountability (Xu et al., 2021).

Coopetition, therefore, represents a promising strategic framework for humanitarian organisations navigating increasingly complex, uncertain, and resource-constrained environments. It provides a structured yet flexible mechanism to harmonise competitive instincts with collaborative imperatives, enabling more resilient, inclusive, and responsive humanitarian action. As disaster risks escalate and aid systems become more interdependent, coopetition will continue to shape the next generation of cross-sector humanitarian partnerships.

This study, therefore, ***defines coopetition as a business strategy where competitors collaborate on certain projects or aspects while simultaneously competing in other areas.***

2.2.9 Dysfunctional Humanitarian Environment

Within the humanitarian sector, which is committed to providing essential aid and support during crises, a range of dysfunctional issues poses a serious threat to operational efficacy. Foremost among these challenges is the pervasive problem of theft, where crucial resources allocated for vulnerable populations are covertly diverted, resulting in a misallocation of aid away from those in acute need. As noted by Ivanovic (2024), this malfeasance not only jeopardises the intended impact of humanitarian efforts but also

erodes trust and exacerbates the manifold challenges faced by affected communities. Corruption stands as another formidable obstacle within the humanitarian space, exacerbating these challenges. When corrupt practices taint the distribution of aid, resources may be illicitly siphoned off, misallocated, or unfairly distributed. As highlighted by BouChabke and Haddad (2021), this unethical conduct not only undermines the principles of fairness and equity but also impedes the overall efficiency of relief operations.

Dysfunctionalities arise from mismanagement and inefficiencies in resource allocation, as posited by Skota (2024). Instances of insufficient coordination among humanitarian organisations or between aid providers and local authorities can lead to the duplication of efforts, resource wastage, and delays in delivering crucial assistance, thereby impeding the efficacy of humanitarian interventions.

The politicisation of humanitarian aid, as shown by Grapengiesser (2024), introduces additional complexities. Assistance becomes influenced by political agendas rather than being exclusively guided by the genuine needs of affected populations. This compromise on neutrality and impartiality challenges the fundamental principles underpinning humanitarian action.

Echendu (2022) posits that the humanitarian space is susceptible to dysfunctionality due to the absence of robust accountability mechanisms and transparency. In an environment lacking stringent oversight, individuals within humanitarian organisations may engage in unethical practices, potentially causing harm to the very communities they endeavour to serve. Addressing these multifaceted challenges requires a collective commitment to

enhancing transparency, implementing accountability measures, and upholding the ethical standards essential for the success and integrity of humanitarian endeavours.

This study utilises a dysfunctional humanitarian environment as a moderator that conditions the operations of humanitarian organisations. It is therefore ***defined as an environment characterised by poor governance and operational breakdowns that obstruct the effective delivery of humanitarian aid, including observable issues such as resource diversion, lack of transparency, and logistical delays.***

2.3 Theoretical frameworks and their elements or dimensions

2.3.1 Co-Creation Theory

The scholarly interest in co-creation has experienced significant growth in recent years, primarily influenced by Vargo and Lusch's (2004). Nevertheless, there has been an expeditious expansion and widespread adoption of co-creation, as identified by Leroy et al. (2013). Divergent findings regarding co-creation can be attributed to the varying theoretical formulations of the concept (Ranjan and Read, 2014). These formulations have different dimensions, such as individuals' active participation (Droge et al., 2010), engagement (Auh et al., 2007), collaboration, cooperation (McColl-Kennedy et al., 2012), and co-productive interaction (Gronroos, 2011).

Value co-creation is increasingly regarded not just as a transactional mechanism, but as a collaborative, multidimensional, and iterative process where multiple social and economic actors—including governments, humanitarian organisations, private sector partners, and affected communities—actively integrate their diverse resources through

interaction and service exchange to generate mutual benefits. This process is inherently dynamic and takes place within interconnected service ecosystems shaped by institutional structures, regulatory frameworks, and cultural norms. These ecosystems act as living platforms for continuous value creation and adaptation in response to evolving needs and contextual complexities (Matarazzo et al., 2024). This perspective underscores the crucial role of stakeholder-oriented management, particularly in humanitarian logistics, where actors must rapidly align under stress, uncertainty, and limited resources (Wiesmeth, 2020).

Co-creation is fundamentally different from mere cooperation. It represents the deliberate pooling and integration of heterogeneous resources—including financial capital, data, infrastructure, local knowledge, and personnel—around shared values and mutual objectives. This method fosters innovative outcomes that transcend the limited contributions of isolated entities, enabling systemic and scalable impact. In humanitarian supply chains, such resource integration often encompasses cross-sector digital platforms, multi-agency logistical networks, and community-led feedback loops that enhance both efficiency and legitimacy (Silva & Cardoso, 2025).

Crucially, while interaction is necessary, it is not sufficient for co-creation. True co-creation arises from purposeful collaboration where even competitors align around a common humanitarian goal. This process reflects a convergence of distinct value systems, as stakeholders engage not only out of obligation but from shared commitment, trust, and a desire to innovate (Shahzad & Ishaque, 2023).

According to Pillitteri et al. (2021), four critical spheres influence the quality and sustainability of co-creation in humanitarian professional services: (1) the attributes of

beneficiaries, including trust, inclusivity, and cultural readiness; (2) the engagement of professional actors who deliver services; (3) the quality and adaptability of service design; and (4) the broader political, social, and environmental context. These spheres interact to determine how co-creation unfolds in complex environments such as long-term refugee integration programs, disaster recovery initiatives, or emergency medical response systems.

Yet, this process is not without its limitations. Power asymmetries between international donors and local responders, or between national agencies and affected communities, can distort stakeholder engagement and hinder equitable participation. These structural inequalities may lead to tokenism or exclusion in decision-making, undermining the very principles of co-creation. Fragmented governance and lack of institutional interoperability further complicate implementation during disaster scenarios, often leading to duplicated efforts or supply bottlenecks (Cluley et al., 2023).

The theory of co-creation is particularly well-suited to disaster management, where speed, accuracy, and contextual sensitivity are essential. It calls for active engagement of a vast network of actors across the disaster management cycle—before, during, and after a crisis. In preparedness, stakeholders collaborate to identify risks, allocate resources, and build anticipatory capacity through training, simulations, and community awareness programs. During response, co-creation supports integrated logistics coordination, cross-border aid mobilisation, and inclusive decision-making structures that adapt in real time (Nascimento et al., 2023).

In recovery phases, co-creation facilitates long-term development planning, community rebuilding, and the inclusion of marginalised groups in the restoration of services and

infrastructure. It also enhances cultural appropriateness in interventions, strengthening the social license of humanitarian actors and increasing intervention uptake and trust (Pillitteri et al., 2021).

Despite contextual barriers, co-creation holds transformative potential in dysfunctional environments where conventional top-down aid approaches often falter. By empowering local actors and leveraging grassroots innovation, co-creation can overcome institutional inertia and promote distributed accountability. Moreover, the integration of digital tools and decentralised data-sharing platforms further strengthens transparency, enabling real-time tracking of aid, collaborative budgeting, and participatory monitoring (Silva & Cardoso, 2025).

Co-creation in disaster preparedness means more than partnership; it requires deep alignment of heterogeneous resources—technological, logistical, informational, and human. It encompasses joint risk mapping, anticipatory planning, and distributed decision-making among actors with overlapping yet distinct objectives. By embedding community perspectives and local institutional knowledge into system design, stakeholders can preposition resources and knowledge networks for rapid deployment (Pillitteri et al., 2021).

In this context, coopetition—the simultaneous pursuit of collaboration and competition—acts as a critical enabler of co-creation. Humanitarian actors, though competing for scarce donor funds, frequently collaborate to pool logistical assets or distribute relief efficiently. These coopetitive dynamics enhance preparedness by leveraging shared infrastructure while maintaining organisational identity and funding channels (Chiambaretto et al., 2020).

Disaster responsiveness—the capacity to mobilise quickly post-impact—also benefits directly from value co-creation. By embedding community voices and fostering transparent coordination mechanisms, co-creation enables culturally sensitive and locally optimised aid delivery. Pillitteri et al. (2021) identify four enabling domains—beneficiary engagement, professional roles, service design, and external environment—that collectively influence humanitarian responsiveness.

In dysfunctional humanitarian environments, where corruption, resource mismanagement, and fragmented governance hinder traditional models, co-creation emerges as a governance innovation. Through decentralised engagement and mutual accountability, stakeholders circumvent centralised bottlenecks and elite capture. This bottom-up approach fosters real-time adaptation, local ownership, and inclusive recovery (Zhang et al., 2021).

Technology plays a pivotal role here. Digital platforms for warehouse management, traceability, and resource matching transform coopetition networks into responsive ecosystems. According to Silva & Cardoso (2025), technologies such as IoT, data analytics, and cloud logistics enhance transparency, reduce asymmetries, and facilitate the rapid integration of actors, even in volatile conditions.

Coopetition frameworks provide the scaffolding for balancing value creation and value appropriation, particularly when addressing budget asymmetries and shifting alliance structures (Chiambaretto et al., 2020). For example, when new actors enter a coopetitive agreement, value creation may rise while appropriation needs renegotiation. This dynamic is vital in humanitarian coalitions where alliances are fluid and crisis-driven.

Moreover, social factors such as trust, shared mindset, and commitment are foundational to co-creation within supply chain ecosystems. Goetz et al. (2022) emphasise that cultivating these social dimensions enhances ecosystem resilience, particularly under competitive and dysfunctional pressures (Goetz et al., 2022).

Co-creation theory—especially when fused with coopetition logic—offers a robust framework for building disaster-resilient systems. It bridges stakeholder fragmentation, supports inclusive preparedness, enables agile responsiveness, and counteracts dysfunction. In a world of increasing disaster complexity and institutional fragility, coopetitive co-creation transforms humanitarian challenges into platforms for collaborative resilience.

2.3.2 Cooperation Theory

The theory of cooperation was proposed by Deutsch (1949a, 1949 b, 1973, 1980) and Deutsch and Krauss (1962), who drew inspiration from the concepts put forth by Lewin and other scholars at MIT's Research Centre for Group Dynamics. In the original study by Deutsch (1949b), college students were assigned to cooperative sections of a college introductory course. Students in cooperative learning groups were informed that everyone in the group would be given the same grade, and that the mark would be determined by how effectively the group collectively discussed and analysed human relations issues. Cooperating students engaged in pleasant conversations, rapidly learned each other's names, were satisfied with their discussions, were attentive and affected by others' remarks, and felt personally safe.

In collaborative efforts, individuals perceive a positive relationship between their achievements of goals, where progress made towards one's own goals facilitates the

attainment of others' goals. Cooperation refers to the absence of conflict and the presence of attraction. Cooperation refers to the interdependence of objectives (in terms of social interactions and productivity), not whether individuals conflict, have lofty aspirations, or are physically attracted to one another. Goal interdependence influences orientation towards each other's behaviour or action in a direct manner. Deutsch classified three categories of actions: effective actions increase a person's odds of achieving their goal, bungling actions decrease these odds, and effective actions help others achieve their goals; they can serve as a substitute for one's effective behaviour and are positively regarded. Bungling behaviours are ineffective; they are irreplaceable and negatively valued. Cooperating individuals attempt to influence and are receptive to being influenced as they strive to perform effectively and achieve their objectives.

Deutsch proposed four cooperation dimensions: Expected and actual assistance. Individuals who actively participate in cooperative endeavours expect their peers to provide support and contribute to the successful attainment of shared goals. *Communication and influence:* In the process of problem identification and collaboration, communication tends to adopt an ad-hoc nature, with requests being fulfilled through cooperative efforts. *Task orientation:* To achieve their shared goals, individuals engage in cooperative behaviour by allocating tasks and providing mutual support to ensure their completion. *Friendliness and support:* Through collaboration, individuals attribute positive significance to each other's competent actions, leading to the development of a favourable disposition towards one another.

The above dimensions, as stipulated by Deutsch, expected and actual assistance, communication and influence, task orientation, friendliness and support, have been

widely praised by reviewers (Deutsch, 1980). People with cooperative ties anticipate that others will assist them in achieving their goals, and they desire to do the same for others (Tjosvold, 1981). People tend to perceive the cooperative actions of others favourably; for example, they may mentor and assist one another in learning (De Vries & Slavin, 1978).

Cooperating individuals are cognizant of and influenced by one another's thoughts and interests (Chen et al., 2023). Cooperation is widely recognised as a catalyst for enhancing the flow and exchange of information in group contexts, especially within humanitarian and disaster management environments. Recent research confirms that cooperative dynamics enhance group communication, facilitate the distribution of shared workloads, and strengthen trust among actors involved in complex problem-solving tasks (Guerrero et al., 2023).

In coordinated humanitarian settings, cooperation not only promotes task clarity and information sharing but also improves efficiency through effective division of labour. Cooperation fosters the dissemination of knowledge and mutual assistance in logistical responsibilities, ultimately leading to stronger group cohesion and performance (Salam & Khan, 2020).

Empirical studies also highlight the link between cooperative group dynamics and productivity. A meta-analysis by Johnson et al. (updated context) suggests that cooperative models outperform competitive or individualistic approaches in terms of problem-solving and group learning. Specifically, groups that practice cooperative interaction demonstrate higher quality outcomes and mutual accountability (Westover, 2024).

Moreover, studies have shown that when cooperative groups include knowledgeable individuals, they can correct misinformation and influence the group toward better decisions. For instance, structured verbal reasoning and peer support within cooperative groups lead to better learning outcomes and greater individual retention of knowledge (Dodds, 2024).

In humanitarian disaster response, these cooperative patterns manifest in coordination centres and inter-agency collaborations. Cooperation among NGOs, government entities, and logistics teams facilitates smoother operations, minimises redundancy, and accelerates the delivery of aid. The existence of trust and shared goals is found to be more influential than rigid command structures in fostering successful response strategies (Robinson, 2019).

In conclusion, updated research supports the longstanding idea that cooperation is not only a means of increasing group productivity but also a vital mechanism for enabling inclusive, responsive, and efficient humanitarian operations. Emphasising trust, shared learning, and interdependence provides a framework for navigating complex disaster scenarios with greater resilience and effectiveness.

Recent research reaffirms that cooperation significantly enhances knowledge sharing, collective efficiency, and overall group productivity. In collaborative settings, individuals who engage in cooperative learning share responsibilities, divide tasks effectively, and support each other’s progress. This dynamic fosters a high level of engagement, improving both task performance and interpersonal relations (Winanti, 2023).

Studies emphasise that effective teamwork is strengthened when group members are equipped with collaborative skills and supported by well-structured learning models. For example, Winanti (2023) found that structured group work models, such as Student Teams Achievement Divisions (STAD), significantly improve both collaboration and learning outcomes in classroom settings (Winanti, 2023).

Similarly, research on collaborative learning environments demonstrates that well-coordinated group interaction not only facilitates task completion but also enhances conceptual understanding and critical thinking. Structured cooperation, such as through peer discussion and task-sharing, leads to higher performance than individual or competitive approaches (Oktavia, 2024).

In digital and professional environments, collaboration is likewise shown to boost productivity and innovation. Zolotina et al. (2023) noted that hybrid and partially remote team structures, when supported by strong cooperative mechanisms, maintain high levels of productivity even during disruptions like the COVID-19 pandemic (Zolotina et al., 2023).

Beyond logistics and productivity, cooperative group structures have a positive impact on individual learning and knowledge retention. Raman (2021) highlights that the intentional use of Appreciative Inquiry to foster collaboration encourages idea-sharing and leads to stronger emotional and cognitive investment among team members (Raman, 2021).

In summary, cooperation is not only a facilitator of operational effectiveness but also a catalyst for enhanced learning, social cohesion, and team performance. Integrating cooperative strategies in both educational and organisational settings can significantly

elevate collective outcomes through shared accountability, structured interaction, and mutual support.

Cooperation theory offers a valuable lens for understanding how coopetition enhances disaster preparedness and response. In humanitarian settings, where organisations must often compete for donor funding while simultaneously collaborating on logistics and service delivery, coopetition aligns well with the core tenets of cooperation theory—goal interdependence, mutual facilitation, and task coordination.

In the context of disaster preparedness, cooperation theory emphasises that shared goals and interdependence lead to more effective planning. Coopetitive relationships support this through joint risk assessments, collaborative training, and coordinated logistics planning, allowing competing actors to align resources and improve anticipatory capacity (Fathalikhani et al., 2020; Schiffling et al., 2020). These partnerships reduce redundancy and optimise the deployment of early warning systems and stockpiled supplies (Silva & Cardoso, 2024).

During disaster response, the theory underscores the importance of trust-based communication and mutual support. Coopetitive networks enable rapid information exchange, pooled access to resources, and shared distribution systems—all of which increase agility and coverage during emergencies (Crick et al., 2024; Butt, 2025). By maintaining goal alignment, these partnerships enable faster and more coordinated action without compromising institutional autonomy.

In dysfunctional humanitarian environments—characterised by fragmented coordination and weak governance—cooperation theory explains how coopetition can mitigate

systemic challenges. Establishing joint operational platforms, promoting shared norms, and embedding accountability mechanisms help reduce conflict, improve transparency, and foster inclusive coordination among actors with varying capacities and agendas (Schiffling et al., 2020; Silva & Cardoso, 2024).

2.4 Hypothesis Development

Based on the study's objectives and the empirical findings detailed in this chapter, the foregoing section develops three hypotheses for the study. These are as follows.

2.4.1 Coopetition and Disaster Responsiveness

Coopetition refers to a business strategy in which competitors collaborate on certain projects or aspects while simultaneously competing in other areas (Gąsiorowska-Mącznik, 2020). Coopetition, a strategic blend of cooperation and competition, proves crucial in enhancing disaster responsiveness, as illustrated by real-world examples. Consider the response to Hurricane Katrina in 2005, where governmental agencies, NGOs, and private entities engaged in coopetition, collaborating on resource sharing and joint efforts to enhance overall responsiveness despite coordination challenges (Lee, 2007; Fathalikhani et al., 2020). Similarly, the COVID-19 pandemic demonstrates coopetition among pharmaceutical companies as they strive to develop and distribute vaccines. Concurrently, cooperation initiatives like COVAX showcased how competing entities could collaborate for a common goal, expediting vaccine development and ensuring a more coordinated pandemic response. The earthquake response in Haiti in 2010 highlights the dynamics of coopetition among international humanitarian organisations vying for funding and recognition (Rossodivita & Cibelli, 2010).

Despite instances of competition, collaborative efforts in resource sharing, medical assistance, and infrastructure rebuilding contributed to a more comprehensive disaster response. Japan's tsunami and nuclear disaster in 2011 witnessed coopetition among international organisations and governments offering aid. Simultaneously, cooperation in nuclear disaster management involved sharing technology and expertise, illustrating how the balance between competition and cooperation can lead to a swift and effective international response. During the Australian bushfires in 2019-2020, firefighting agencies engaged in coopetition for resources and recognition. However, collaborative firefighting efforts, which integrate different agencies and countries, showcase the synergy between competitive innovation and cooperative resource allocation, ultimately enhancing the overall effectiveness of firefighting operations.

These examples underscore a core principle of cooperation theory: that actors who perceive their goals as interdependent are more likely to engage in mutual support, communication, and coordinated action. In the context of disaster management, humanitarian organisations may operate in a competitive landscape—vying for donor funding, public recognition, or operational dominance—but the urgency and complexity of disaster response compel them to work together. Cooperation theory suggests that such interdependence fosters psychological safety, shared responsibility, and joint problem-solving, which are essential when lives and livelihoods are at stake.

This dynamic manifests in the form of shared logistics operations, coordinated needs assessments, and joint decision-making platforms. While competitive pressures can drive innovation and strategic agility, it is the cooperative component—rooted in mutual aid and trust—that ensures the efficient allocation of scarce resources, reduces duplication, and

enhances responsiveness (Crick & Crick, 2020). Thus, a coopetitive approach, framed by cooperation theory, provides a structured yet flexible mechanism for humanitarian actors to deliver more timely, inclusive, and impactful interventions during crises.

Thus, this study hypothesises that:

H1: Coopetition is positively related to disaster responsiveness.

2.4.2 Coopetition, Disaster Preparedness and Disaster Responsiveness

Coopetition is instrumental in disaster preparedness, as it entails organisations collaborating while simultaneously competing, allowing them to pool expertise, funds, and capabilities to create more comprehensive and effective preparations and responses to disasters. In the context of disaster management, this synergy enhances the overall preparedness and responsiveness of entities involved.

Also, the competitive drive inherent in coopetition encourages innovation and agility (Guo et al., 2023). As organisations compete in a cooperative environment, they are motivated to find novel and efficient solutions for disaster management. This innovation enhances the adaptability and responsiveness of organisations to unforeseen events. Further, coopetition fosters shared learning (Bacon et al., 2020). Organisations engaged in coopetition exchange knowledge, insights, and experiences. In disaster management, sharing lessons learned from past incidents, best practices, and failures significantly contributes to overall preparedness and effectiveness. Additionally, coopetition promotes optimised resource allocation. Despite competition for resources, coopetition encourages coordinated efforts, resource sharing, and the avoidance of unnecessary duplication of functions. This optimised allocation is crucial for a timely and effective response to

disasters. Moreover, coopetition encourages the development of collaborative networks. In disaster management, fostering a well-connected and cooperative network of organisations—including those that are typically competitors—has become increasingly vital to ensuring a timely and effective response. Cooperation theory, which emphasises goal interdependence, mutual influence, and shared responsibility, provides a powerful lens through which to understand the benefits of such networks. As Fathalikhani et al. (2020) note, cooperative ties facilitate streamlined communication and coordination, enabling the rapid exchange of information and more synchronised operational strategies. These interactions are especially crucial in the high-pressure, time-sensitive contexts of natural disasters, where fragmented or siloed responses can lead to duplication of efforts, resource waste, or life-threatening delays.

Through the cooperation theory framework, coopetition emerges as a strategic enabler of disaster preparedness. By encouraging resource sharing and collaborative planning, coopetitive arrangements reduce logistical bottlenecks and ensure that organisations are better equipped to mobilise when disaster strikes. For instance, agencies that pre-position supplies together or develop joint contingency plans are practising the kind of shared task orientation emphasised in cooperation theory, where mutual success depends on collective effort rather than isolated performance.

Coopetition also facilitates collaborative learning and innovation. Organisations learn from one another through joint simulations, after-action reviews, and cross-agency training, improving both technical capabilities and inter-agency trust. Cooperation theory posits that such trust and mutual responsiveness are foundational to sustaining long-term collaboration. In this way, the theory helps explain how even rivals can engage in

constructive joint ventures, fostering both system resilience and organisational adaptability.

On a global scale, coopetition fosters international collaboration in responding to transnational disasters such as pandemics, climate-induced migration, or cross-border flooding. While nations and NGOs may compete for influence, visibility, or donor loyalty, the cooperative undercurrent—grounded in shared goals like humanitarian protection or environmental resilience—promotes coordinated global action. Cooperation theory's emphasis on psychological safety and mutual goal pursuit is instrumental in reducing geopolitical friction and facilitating aid harmonisation across borders (Bacon et al., 2020; Guo et al., 2023).

Finally, coopetition encourages the development of robust, interconnected humanitarian ecosystems. These networks are not only efficient but also adaptive, capable of adjusting to evolving threats through distributed leadership and joint governance mechanisms. This dynamic synergy between competitive drive and cooperative alignment reflects the core tenets of cooperation theory and contributes to creating a disaster management environment that is not only well-prepared but also structurally resilient (Merz et al., 2020; Vargo & Lusch, 2016). As such, coopetition—when underpinned by cooperation theory—offers a strategic pathway to enhance both the preparedness and responsiveness of global disaster systems.

Thus, this study hypothesises that:

H2: Coopetition is positively related to disaster preparedness.

H3: Disaster preparedness positively influences disaster responsiveness.

H4: Disaster preparedness positively mediates the relationship between coopetition and disaster responsiveness.

2.4.3 Moderating Role of Dysfunctional Humanitarian Environment

Dysfunctional elements within disaster management agencies or organisations encompass various detrimental activities, including procurement violations, overcharging, and the presentation of inflated disaster management budgets. Procurement violations, a subset of organisational challenges, involve corrupt practices such as awarding contracts without following proper procedures, accepting bribes, or inflating prices. These actions not only result in financial losses but also compromise the integrity of the procurement system, undermining the delivery of essential resources to disaster-affected populations.

Overcharging, another manifestation of the dysfunctional nature of humanitarian organisations, involves employees adding unauthorised costs or fees to products, services, or contracts during the purchase, transportation, or distribution of aid items. This leads to financial exploitation and diversion of resources from their intended purpose. Additionally, organisations involved in disaster management may present inflated budgets, exaggerating the funds needed for response and recovery efforts. Such inflated budgets create opportunities for individuals within the organisation to misappropriate or divert funds for personal gain, ultimately compromising the effectiveness of disaster management operations.

In a comprehensive empirical analysis covering 16 countries from Asia and the Middle East, Zafar et al. (2023) explored the relationship between disasters and corruption in disaster management. Their findings revealed a significant negative correlation between

corruption, specifically challenges within organisations, and natural disaster management. The study highlighted the propensity for such dysfunctional conditions to increase in the aftermath of natural and man-made disasters, emphasising the need to address challenges for effective disaster management.

Co-creation theory, rooted in Service-Dominant Logic, emphasises that value in complex systems—such as humanitarian aid—is generated not in isolation but through the collaborative integration of resources, shared decision-making, and mutual adaptation among stakeholders. This framework becomes especially relevant in dysfunctional humanitarian environments, where corruption, fragmented governance, and misallocation of resources undermine disaster preparedness. Coopetition—the dual dynamic of cooperation and competition—acts as a mechanism through which co-creation can be strategically applied to overcome these dysfunctions and enhance preparedness.

In dysfunctional environments, no single organisation holds all the knowledge or capacity to prepare adequately for complex disasters. Co-creation theory underscores the integration of complementary resources. Within a coopetitive structure, NGOs, governments, private firms, and communities can combine assets—such as early warning systems, logistics expertise, and outreach networks—to co-develop preparedness strategies despite underlying rivalry. This form of heterogeneous resource integration increases system resilience even when institutional frameworks are weak (Fathalikhani et al., 2018).

Additionally, coopetition supports the creation of shared governance platforms, such as inter-agency planning hubs. These platforms mitigate elite capture by democratising input into disaster preparedness plans. Cooperation theory suggests that such mutual task

orientation strengthens accountability and inclusiveness, encouraging more legitimate and context-sensitive preparedness outcomes (Pillitteri et al., 2021).

Trust and psychological safety, critical to co-creation, are fostered through “swift trust”—a rapid, situationally driven form of confidence built during early interactions. Research shows that even under uncertain or high-stress disaster contexts, coopetitive actors can establish trust incrementally through joint simulations, shared training, or aligned responses. This trust reduces coordination costs and encourages stakeholders to share sensitive or high-stakes data crucial for preparedness (Schiffling et al., 2020).

Moreover, coopetition-driven co-creation promotes innovation. By exchanging perspectives and tools—such as scenario modelling or joint digital dashboards—organisations can generate more robust and adaptive preparedness strategies. These approaches often sidestep rigid or inefficient government structures, allowing flexible, bottom-up solutions to emerge (Silva & Cardoso, 2025).

Transparency and anti-corruption are also enhanced. Co-created digital platforms for logistics coordination or resource tracking—developed through coopetitive agreements—create shared visibility, reducing the opportunity for fraud or resource hoarding (Fathalikhani et al., 2020).

Thus, this study hypothesises that:

H5: Dysfunctional humanitarian environment positively moderates the relationship between coopetition and disaster preparedness.

2.5 Conceptual Model

This study develops and tests a conceptual model (Figure 2.2) of the mechanism through which coopetition through disaster preparedness influences disaster responsiveness and the conditional role of a dysfunctional humanitarian environment. The study draws from two theories: co-creation theory and cooperation theory.

The model argues that, based on the co-creation and cooperation theory, the emphasis of coopetition lies on cultivating positive interdependence, effective communication, and the pursuit of shared goals among individuals or groups. Therefore, in disaster management, it is posited that coopetition plays a pivotal role in nurturing collaboration (Baruch & Lin, 2012). This, in turn, amplifies disaster preparedness by facilitating the pooling of shared resources, exchange of critical information, and the orchestration of coordinated efforts (Saharan, 2015). The essence of co-creation theory is centred on collaborative endeavours for value generation, which seamlessly correlates with coopetition in the context of disaster management. Under this paradigm, stakeholders actively participate in co-creating solutions, sharing knowledge, and engaging in collective activities (Loureiro et al., 2020). This collective effort significantly contributes to enhancing disaster preparedness and, consequently, fortifying responsiveness. Hence, coopetition influences disaster preparedness and responsiveness.

Furthermore, drawing on the co-creation theory, the moderating influence of a dysfunctional humanitarian environment assumes paramount significance within the nexus of coopetition dynamics and disaster preparedness initiatives in the context of disaster management (Risi et al., 2023). Co-creation theory provides a comprehensive

lens through which to analyse this intricate interplay, unravelling the multifaceted impact of co-creation on the relationship between coopetition and disaster preparedness.

The dysfunctional humanitarian environment, acting as a moderator in this theoretical construct, signifies a critical moderating force sculpted by diverse institutional factors. This environmental moderator introduces a layer of complexity, influencing the extent to which coopetition strategies contribute to or detract from the efficacy of disaster preparedness efforts (Corbo et al., 2023).

Within this theoretical framework, the institutional framework provides valuable insights into the formal and informal rules that govern behaviour within the humanitarian space. These rules, encompassing regulatory structures, normative expectations, and informal practices, collectively contribute to the configuration of the dysfunctional humanitarian environment. The interplay of these institutional elements with coopetition dynamics and disaster preparedness initiatives becomes a focal point for analysis (Corbo et al., 2023).

In essence, the dysfunctional humanitarian environment serves as a moderator, underscoring the contingent nature of the relationship between coopetition and disaster preparedness. It serves as a lens through which to comprehend the nuanced ways in which institutional influences shape the effectiveness of coopetitive strategies in the context of disaster management (Rodgers et al., 2022). This theoretical framework enriches our understanding of the contextual forces at play, providing a more holistic view of the intricate dynamics inherent in the coopetition-disaster preparedness paradigm within the humanitarian ecosystem.

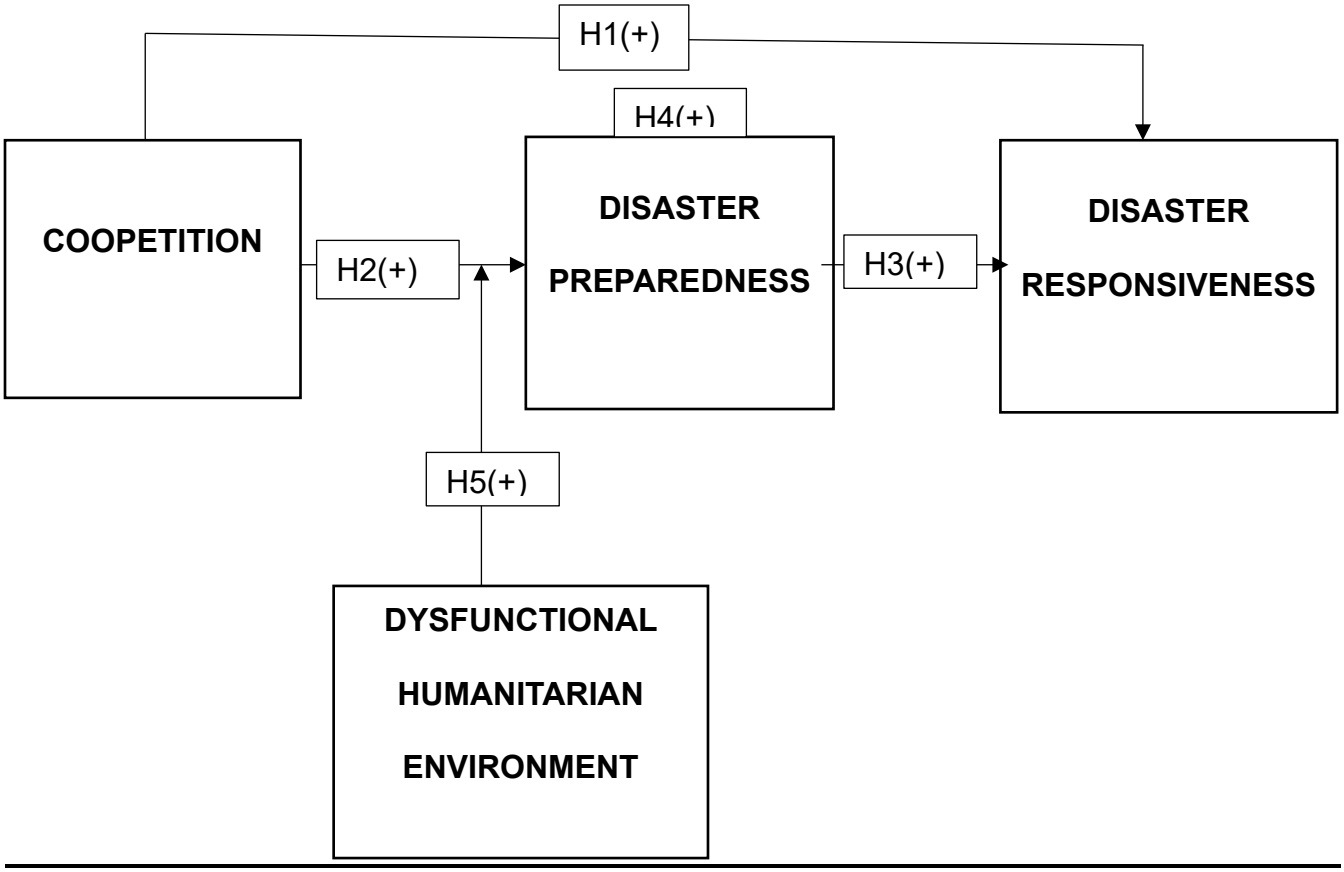

Figure 2.2: Conceptual Model

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The chapter three is focused on the research methodology. This chapter covers various aspects, including the research design, study population, sample size, sampling techniques, and the research instrument used. Additionally, it provides detailed information about the methods used to validate the research instrument and the procedures for data analysis. Furthermore, the chapter addresses the ethical considerations taken into account during the research.

3.2 Research Paradigm/Philosophy

This research adopted the positivist paradigm as its foundational framework to investigate the research inquiries posited in the study, as advocated by Bunniss and Kelly (2010). The positivist paradigm posits a singular, objective reality that is amenable to empirical examination, emphasising the necessity for research to be conducted impartially, free from the influence of the researcher's subjective values, beliefs, and biases. Primarily, this paradigm was dedicated to hypothesis testing, employing quantitative methods and data to examine empirical phenomena rigorously. Moreover, the positivist approach entailed the systematic collection of empirical data as a means to scrutinise and validate the formulated hypotheses, thereby contributing to the scientific rigour and objectivity of the study.

3.3 Research Design

To comprehensively examine how coopetition influences disaster preparedness and responsiveness in a dysfunctional humanitarian environment, this study adopts a descriptive research design within a deductive framework. This approach is suitable for testing theory-driven hypotheses by collecting and analysing observable data to confirm or refute theoretical relationships among variables. As highlighted by Mugwang (2014), a descriptive design allows for the systematic collection, organisation, and analysis of data to provide a clear picture of current conditions and relationships. This makes it particularly valuable in empirical settings where nuanced stakeholder dynamics—such as cooperation and competition among humanitarian actors—are involved.

The decision to use a descriptive design is also supported by precedent in disaster management literature. Prior studies, such as those by Altay et al. (2018), Chari et al. (2020), and Sofe (2020), have successfully employed this approach to map patterns in preparedness planning, coordination mechanisms, and emergency response frameworks. By using descriptive statistics (such as means, frequencies, and standard deviations) and inferential statistics (including correlation and regression analyses), this study aims to identify both the current state and potential causal relationships between coopetition practices and disaster management outcomes.

In addition to quantifying observable patterns, this design provides a framework for understanding developmental stages, behavioural trends, and institutional interactions within humanitarian systems, especially under challenging conditions such as fragmented governance, corruption, and resource constraints. Following Creswell and Creswell (2017) and Kumar (2018), the descriptive approach will guide both the formulation and

testing of hypotheses, utilising structured instruments such as surveys or structured interviews to collect data from key stakeholders in government agencies, NGOs, logistics providers, and community actors.

The analysis will focus on three major domains: (1) the degree of coopetitive interaction between humanitarian stakeholders, (2) the effectiveness of disaster preparedness strategies (e.g., early warning systems, joint planning, and training), and (3) the responsiveness of supply chain interventions during and after natural disasters. This multidimensional lens allows the researcher not only to describe existing conditions but also to uncover latent relationships and inform policy and operational recommendations.

3.4 Research Approach

The primary aim of this research was to investigate the impact of coopetition on disaster responsiveness and preparedness within the context of a dysfunctional humanitarian environment. This study employed a quantitative research approach to systematically analyse and quantify the relationships between the variables of interest. The quantitative approach was chosen for its ability to provide numerical data, statistical insights, and objective measurements, thereby facilitating a rigorous and empirical investigation into the specified research objectives. Through this methodology, the study aims to provide valuable insights into the intricate dynamics of coopetition, disaster responsiveness, and preparedness within a dysfunctional humanitarian environment, thereby fostering a deeper understanding of these critical aspects in the field of disaster management.

Compared to the interpretivist paradigm, which characterises qualitative approaches, the positivist paradigm is more closely aligned with quantitative research methodology. External validity (control) and generalizability are given priority in this perspective. The

first step in the quantitative method is a thorough assessment of relevant literature to create a conceptual framework that outlines key variables and their expected connections (Bickman and Rog, 1998). In deviance from the qualitative method, the researcher may choose to use field interviews to clarify variables, improve the conceptual framework, or refine measurements (Golicic et al., 2005).

Unlike qualitative or interpretivist approaches—which explore subjective meanings and contextual nuances—the quantitative paradigm facilitates hypothesis testing through empirical data and supports the development of generalisable inferences (Bickman & Rog, 1998; Kerlinger & Lee, 2000). This aligns with the study's goal of examining causal relationships between well-defined constructs in a structured and systematic manner.

As we go down the quantitative trajectory, the next step is to develop a formal theory based on previous research. Formal theories established under the quantitative paradigm should be capable of producing testable predictions, even if they may have broad relevance to a variety of events and populations (Kerlinger and Lee, 2000). This entails challenging the theory with empirical facts related to the phenomenon (Hunt, 1991).

Golicic et al. (2005) emphasise the significance of developing hypotheses and point out that the researcher should formulate hypotheses in answer to research questions that stem from the formal theory before starting data collection. This process, which begins with a broad viewpoint (i.e., the theory) and is refined into details in the form of facts, is based on deductive reasoning (ibid).

Then, real data is gathered from the field using carefully crafted measuring tools that are used in field surveys or studies. By carefully evaluating the importance and potency of

the suggested links expressed in the hypotheses, the goal is to validate the formal theory. After a quantitative study is completed, the investigator gains a deeper understanding and explanation of the phenomenon, which may lead to new questions for future research (Golicic et al., 2005).

3.5 Population

A wide range of institutions and organisations actively involved in natural disaster management made up the study's population. This comprises, among others, local community-based organisations, international humanitarian organisations, non-governmental organisations (NGOs) that specialise in disaster relief efforts, government agencies in charge of disaster response and mitigation, and private companies that provide disaster management services. Among this large populace, government organisations may include local municipal entities responsible for disaster relief and preparation, as well as national disaster management agencies and regional emergency response units. Humanitarian agencies, volunteer organisations, and advocacy groups that emphasise catastrophe resilience are examples of non-governmental organisations that work in the field of disaster management. This group includes crucial international institutions, such as United Nations agencies and regional disaster response authorities, which have a mission focused on disaster response and preparation. In addition, the study's population includes underground community-based groups that support local communities' preparedness and response to disasters. The varied makeup of these institutions and organisations guarantees a thorough examination of the dynamics and interconnections present in the field of natural disaster management.

Therefore, the study focuses on natural disaster management institutions such as the National Disaster and Management Organisation (NADMO), the Ghana Police Service, the Ghana National Fire Service (GNFS), Non-Governmental Organisations and Faith-Based Organisations, among others. This aligns with Negi and Negi's (2021) assertion in the literature that the actors in the supply chain comprise the various groups and individuals who take part in and make contributions to humanitarian logistics and disaster management.

3.6 Sample Size

The researcher finds it challenging to rely on random sampling techniques when a suitable sample frame isn't available. Ghana has a dearth of trustworthy business information (Adomako et al., 2016; Boso et al., 2013a). Information is provided differently by several institutional databases, such as Ghana Yellow, the Ghana Business Directory, Yellow Pages Ghana, the Association of Ghana Industries (AGI), and the Registrar General's Department. Previous studies tackled this problem from different angles. To establish a list of firms of interest to examine, some researchers (Acquaah et al., 2011; Adomako et al., 2018a; Acquaah, 2007) relied on single sources, while others (Boso et al., 2013a; Adomako et al., 2016) used numerous sources.

In this study, the use of the Ghana Yellow online directory as a sampling frame is methodologically justified by several academic and empirical considerations relevant to Ghana’s research context. First, Ghana Yellow provides a comprehensive and publicly accessible database of registered businesses across various sectors, including detailed information on location, business category, contact details, and often size and registration history. This level of transparency and coverage is beneficial in contexts where official

government directories (such as those from the Ghana Revenue Authority or the Registrar General's Department) may be less accessible for academic research purposes. As Amankwa et al. (2023) argue, digital platforms in Ghana are increasingly relied upon for business data sourcing, given the rise of e-commerce and mobile-enabled research tools (Amankwa et al., 2023).

Second, the Ghana Yellow directory is frequently updated, which supports the temporal relevance and reliability of sampling frames derived from it. Agyapong et al. (2024) highlight the need for up-to-date sampling frames in studies of small and medium enterprises (SMEs), noting that out-of-date lists can skew findings or omit relevant segments of the business population (Agyapong et al., 2024).

Furthermore, online business directories such as Ghana Yellow align with the country's increasing digitisation of enterprise data management. As noted in the study by Lambongang (2023), internet-based systems are increasingly used by both researchers and consumers in Ghana to locate and assess businesses, underscoring their relevance and utility in contemporary research applications (Lambongang, 2023).

Finally, using Ghana Yellow promotes efficiency in data collection. Its structured, categorised listings allow researchers to stratify samples by region, industry, or business size, enhancing the representativeness and generalizability of research findings. This has practical implications for disaster preparedness and humanitarian supply chain studies that require granular business data for survey deployment or case selection.

To estimate the sample size in the absence of a sampling frame, one approach is to use a formula; one commonly used formula is the following:

$$n = \frac{(Z^2 \times p \times q)}{E^2} \quad (1)$$

Where:

n *Is the sample size*

Z *Is the z-score corresponding to the desired level of confidence (e.g., 1.96 for 95% confidence)*

p *Is the estimated proportion of the population with the characteristic of interest (if unknown, 0.5 can be used as a conservative estimate)*

q *is the complementary probability of p (i.e.,* $q = 1 - p$*)*

E *Is the desired level of precision (i.e., margin of error)*

Using this formula, let's assume we want a 95% confidence level, a margin of error of 5%, and a conservative estimate of 0.5 for p (since we have no prior knowledge about the proportion of the population with the characteristic of interest). The z-score corresponding to a 95% confidence level is 1.96. Thus, the formula becomes:

$$n = \frac{(1.96^2 \times 0.5 \times 0.5)}{0.05^2} \quad (2)$$

$$n = 384.16 \quad (3)$$

Therefore, we would need a sample size of at least 385 respondents to achieve a margin of error of 5% with 95% confidence. Thus, a sample size of 385 respondents will be used to gather quantitative data.

3.7 Sampling Technique

A variety of sampling techniques were employed in the research, as it was an experimental study. The following methods were used to guarantee a thorough comprehension of the population being studied:

(i) Sampling by Cluster: This technique includes grouping the population into clusters or groups, then selecting participants at random from each group. Based on a variety of factors, including activities and geography, clusters of disaster-based organisations were established. After that, the population as a whole has sufficient representation for each cluster.

(ii) Convenience sampling: This sampling technique involves selecting a small sample that is readily available to the researcher; this sample is often chosen based on factors such as cost-effectiveness, speed, and convenience. Convenience sampling was employed to select companies that were accessible and willing to participate in the research. Although this approach is useful, it may limit the extent to which the findings can be applied to the intended audience.

(iii) Snowball sampling: This methodology involves the first selection of subjects who satisfy the inclusion criteria, followed by an invitation to suggest additional subjects who fit the requirements. After being recognised as participants who fit the study's requirements, those people recommended further candidates. Although snowball sampling helps identify individuals who are challenging to reach, it may be problematic to extrapolate the results to the target population as a whole.

Although each sampling technique has its advantages and disadvantages, these techniques were selected for their suitability to the study's goals and practical concerns. By combining these techniques, we were able to provide a sophisticated and perceptive examination of the people we were researching.

For this study, participants were selected from organisations actively engaged in humanitarian aid, disaster preparedness, response, or emergency-related supply chain operations. Eligible organisations were required to be registered in Ghana and verified through sources such as the Ghana Yellow Pages database. The study focused on Non-Governmental Organisations (NGOs), Civil Society Organisations (CSOs), and other nonprofit entities, as well as governmental bodies directly involved in disaster management, such as NADMO and relevant public health agencies.

Respondents held mid-to-senior-level operational roles—such as Operations Managers, General Managers, Directors, Deputy Directors, or CEOs—and had a minimum of one year of experience in disaster management. Eligible organisations had operated for at least one year, employed a minimum of two staff, and conducted activities within Ghana. All respondents voluntarily provided informed consent to participate in the study.

Importantly, disaster victims were not included in this study. This methodological decision aligns with the study’s focus on strategic, logistical, and managerial dynamics within humanitarian institutions, which are best understood from an organisational perspective. Including victims would shift the unit of analysis to the individual level, thereby diverting attention from the managerial practices that are central to understanding coopetition, disaster preparedness, and responsiveness. Victims, while critical stakeholders in disaster contexts, typically do not possess the operational or strategic insights needed to

evaluate organisational coordination or inter-agency dynamics. Studies such as those by Quarantelli (1998) have emphasised that disaster research at the managerial level is fundamentally concerned with how institutions such as emergency services, NGOs, and state actors function under crisis conditions, not the individual experiences of those affected (Quarantelli, 1998). Similarly, Mutebi et al. (2020) highlight how key variables such as self-organisation, adaptability, and inter-organisational coordination require data from within organisational structures, not from beneficiaries (Mutebi et al., 2020). Additionally, ethical concerns around researching disaster victims—particularly their vulnerability and limited capacity for informed consent in crisis settings—are well-documented in disaster ethics literature (Shuster, 2014).

The study excluded private, for-profit entities not involved in humanitarian disaster response unless they served as recognised logistical partners. This is consistent with best practices in humanitarian logistics, where only actors with established disaster-response roles are considered relevant for operational research (Ferrer et al., 2018). It also excluded frontline or support staff without decision-making roles, in line with the need to gather strategic-level insights from individuals responsible for coordination and preparedness decisions (Mutebi et al., 2020). Further, individuals or organisations with less than one year of operational experience in disaster management were excluded to ensure respondents possessed adequate exposure to contextual challenges and cycles of response. Lastly, international organisations without a registered or active footprint in Ghana were excluded to avoid potential misalignment between global policy frameworks and local operational realities—a known issue in humanitarian deployment (Rosario, 2020).

3.8 Research Instrument and Data Collection

3.8.1 Research Instrument

The primary tool used in this study was a structured questionnaire. The seven-point Likert scale (1 = n/a, 2 = strongly disagree, 3 = disagree, 4 = neither agree nor disagree, 5 = somewhat agree, 6 = agree, and 7 = strongly agree) was designed to collect data on participants' responses in a thorough manner. It asked about age, gender, job title, years of experience, and involvement with organisations, among other demographic questions. The questionnaire was divided into five parts, each corresponding to one of the main components of the research.

The goal of the first portion, which focused on disaster preparation, was to learn more about participants' attitudes and behaviours regarding catastrophe readiness. The second section examined coopetition by probing participants' involvement in cooperative and competitive activities and their perspectives on the dynamics of cooperation and competition. Subsequently, the third segment explored the dysfunctional humanitarian environment, aiming to gather data on the existence and consequences of dysfunctional components within the broader humanitarian framework. To document participants' experiences and activities in responding to catastrophes, the fourth component focused on disaster responsiveness. Finally, the fifth segment was devoted to demographics, collecting data on the respondents' organisational and personal traits.

The study aimed to gather diverse and nuanced perspectives from participants by using a structured questionnaire that included a Likert scale and comprehensive topic sections.

This approach contributed to a full understanding of the research constructs. Table 3.1 presents the measurement items.

Table 3.1 Measurement items

Variable	Operational Definition	Measure	Reference
Coopetition	Coopetition is a business strategy in which competitors collaborate on specific projects or aspects while simultaneously competing in other areas.	We often find valuable partners amongst our most direct competitors.	Riquelme-Medina et al. (2022); Mariama & Belitski (2023); Vapola et al. (2008); Pathak et al. (2014).
		We collaborate with competitors to achieve common goals.	
		We collaborate with competitors to access resources that our firm lacks.	
		Collaboration with competitors is an effective way to enhance our competitive position.	
		When we establish a relationship with our competitors, active collaboration is very important to us.	
Disaster Preparedness	Disaster preparedness refers to the proactive and systematic efforts undertaken by humanitarian organisations to minimise the impact of disasters.	We always need to be alert for possible disasters.	Raikes, et al. (2019); Awuah-Gyawum, et. al. (2019); Park et al. (2019); Haddow et al. (2013); Verheul & Dückers (2020)
		We recognise that disasters are always looming.	
		We often think about how the effects of a particular disaster could have been avoided or reduced.	
		After a disaster has occurred, it is analysed thoroughly.	
Dysfunctional humanitarian environment	A dysfunctional humanitarian environment refers to a setting marked by challenges, mismanagement, and inefficiencies that impede the effective delivery of humanitarian aid, including issues such as theft, procurement breaches, corruption, and resource misallocation.	During disasters, the allocation of resources lacks transparency.	Boso et al. (2023); Liu and Atuahene-Gima, (2018); BouChabke & Haddad (2021); Gordon-Gibson (2021)
		In our industry, resources are not efficiently utilised in disaster situations.	
		In our industry, accountability practices in disaster management are weak.	
		In our industry, there are insufficient measures to prevent misappropriation during disaster management.	
		In our industry, there is a lack of effective systems to ensure compliance.	
		In our industry, there is a lack of effective systems to enforce humanitarian regulations.	
		In our industry, corruption, including bribery, fund diversion, nepotism, and theft, is prevalent in our humanitarian operations.	

		In our industry, disaster management is characterised by weaknesses and inefficiencies in addressing crisis challenges.	
Disaster responsiveness	Disaster responsiveness is the prompt initiation of actions to meet immediate needs during a disaster.	Responses to disasters are initiated promptly to address immediate needs.	Deen (2015); Mehryar, et al. (2021); Quarshie, al. (2020); Abdel-Basset (2020); Hofmann et al. (2015)
		The goods provided in response to a disaster are appropriate and meet the specific needs of the affected individuals or communities.	
		The quantity of goods provided in response to a disruption is accurately tailored to meet the actual demand and requirements.	
		The quality of goods provided in response to a disaster meets or exceeds the necessary standards and expectations.	

3.8.2 Data Collection

The data collection process for this study involved distributing a structured questionnaire to the target population. The questionnaire was delivered to respondents after obtaining their consent to participate in the study. Participants were informed of the study's objectives, the purpose of their involvement, and the confidentiality and anonymity of their responses.

The data collection exercise lasted two to three months, during which participants had the option to complete the questionnaire online. This involved sending participants a link to the questionnaire via email or text message.

The questionnaire consisted of five sections, each corresponding to the objectives of the study, and was structured as a 7-point Likert scale (1 = n/a, 2 = strongly disagree, 3 = disagree, 4 = neither agree nor disagree, 5 = somewhat agree, 6 = agree, and 7 = strongly agree). A 7-point Likert scale was adopted in this study to enhance measurement sensitivity, increase response variability, and improve data reliability. The 7-point scale allows respondents to express more nuanced attitudes, which is particularly useful when capturing perceptions of complex constructs such as coopetition, preparedness, and responsiveness. Prior research has demonstrated that 7-point scales strike a better balance between response precision and cognitive ease, offering superior psychometric performance in terms of reliability and validity (Colman, Norris, & Preston, 1997; Finstad, 2010). Therefore, its use in this study aligns with established methodological recommendations in organisational and behavioural research.

Upon completion of the questionnaire, participants were required to submit their responses online. The collected data were then subjected to a data cleaning and analysis process, where statistical tools and techniques, such as frequency analysis, correlation analysis, and regression analysis, were employed to extract meaningful insights. The findings were compared to existing literature for inferences.

3.8.3 Instrument validation

Instrument validation in this study ensured that the research instrument, specifically the questionnaire, accurately measured what it was intended to measure. The validation process involved testing the questionnaire to ensure its reliability and validity, which were essential for obtaining reliable and valid results. Two types of validation were employed: content validation and pilot testing. Content validation was achieved by ensuring that the questions in the questionnaire were relevant to the research objectives and accurately measured the intended constructs. To accomplish this, the questionnaire was reviewed by a panel of experts in the fields of natural disaster management and supply chain management. These experts assessed the questionnaire's relevance, clarity, and accuracy regarding the research objectives.

The second type of validation, pilot testing, involved administering the questionnaire to a small sample of the population to test its reliability and validity (Salkind, 2010). In this study, a pilot test was conducted with a sample of 30 respondents. The pilot test helped identify issues with the questionnaire's structure and the format of questions, allowing for necessary adjustments before administering the questionnaire to the full sample.

Following the pilot test, several corrections were made to enhance clarity and coherence. Ambiguously worded questions were rephrased for better understanding, and some technical terms were simplified to ensure accessibility to all respondents regardless of educational background. The sequence of certain sections was also rearranged to improve the logical flow of the instrument. Additionally, response options for a few Likert-scale items were adjusted to better reflect the range of possible opinions. These refinements contributed to improving the instrument's face validity and internal consistency before its use in the main study.

The reliability of the questionnaire was tested using Cronbach's alpha coefficient, a measure of internal consistency. A Cronbach's alpha coefficient of 0.7 or higher was considered acceptable. Validity was tested through construct validity, which determined whether the questionnaire accurately measured the intended constructs. Construct validity was assessed using factor analysis to identify any underlying constructs or dimensions within the questionnaire. Additionally, interview questions were reviewed by the supervisor or an expert in the area of natural disaster management to ensure accuracy.

3.9 Ethical Consideration

The study raised several ethical concerns that were addressed systematically. Ethical approval for this study was granted by the College of Business, Arts and Social Sciences Research Ethics Committee at Brunel University London (Ref: 42471-LR-Mar/2024-50382-2) for the period between 12 March and 10 June 2024. The approval required adherence to specific ethical conditions, including obtaining organisational permissions, using approved participant information sheets and consent forms, and maintaining the

integrity of the research protocol. The study ensured that informed consent, confidentiality, and voluntary participation were maintained, thereby complying fully with the university's ethical standards. Participants were provided with adequate information about the study, including its purpose, procedures, and potential risks and benefits (Beauchamp & Childress, 2019). Informed consent was obtained from participants before their inclusion in the study. This was achieved by providing potential participants with a consent form that outlined the study's purpose and procedures, the rights of the participants, and the researchers' contact information in case they had questions or concerns.

Another critical ethical concern was confidentiality and privacy (Mertens, 2015). To ensure the confidentiality and privacy of participants, the researchers did not collect any identifiable information. Participants were given the option to remain anonymous or use a pseudonym if they preferred. Additionally, all data collected was stored securely and made accessible only to the research team.

A third ethical consideration involved the potential for harm or discomfort (Flick, 2018). Some questions in the questionnaire could elicit emotional responses from participants, particularly those who had previously experienced theft or natural disasters. To mitigate this concern, the questionnaire included a debriefing section that provided information about available resources and support services for participants who may have needed them.

Lastly, the potential for conflict of interest was addressed (Mertens, 2015). The researcher declared any conflicts of interest and took steps to minimise their impact on the study's findings. Overall, the study was conducted ethically and responsibly, respecting the rights

and welfare of research participants. Ethical concerns were managed through obtaining informed consent, ensuring confidentiality and privacy, minimising harm or discomfort, and declaring and addressing any conflicts of interest.

3.10 Data Analytical Technique

The quantitative data collected from the questionnaire underwent a rigorous analysis using descriptive statistics and Structural Equation Modelling (SEM) techniques to ensure a comprehensive understanding of the relationships between the variables under investigation. Descriptive statistics served as the initial step in data analysis, providing a detailed overview of the dataset, including measures of central tendency, variability, and frequency distributions (Field, 2018). This foundational analysis ensured that the data were appropriately prepared for more complex statistical procedures.

Following this, the PLS Algorithm was employed for data screening to identify and address any missing values, outliers, or inconsistencies that might have compromised the validity of the findings. PLS-SEM, or Partial Least Squares Structural Equation Modelling, was particularly suited for this exploratory study and the complex model involving multiple constructs and indicators (Hair et al., 2021). This method allowed the study to focus on prediction-oriented modelling and theory testing, aligning well with the research objectives.

To ensure the reliability and validity of the constructs, several key metrics were assessed. Cronbach's Alpha measured internal consistency reliability, with a threshold of 0.7 or higher considered acceptable (Nunnally & Bernstein, 1994). Composite reliability was also calculated, offering a more refined estimate of reliability that accounted for the varying loadings of indicators on their respective constructs (Hair et al., 2021). Average

Variance Extracted (AVE) was used to evaluate convergent validity, ensuring that the constructs explained a sufficient proportion of the variance in their indicators. A value of 0.5 or above indicated acceptable validity (Fornell & Larcker, 1981).

Discriminant validity, which ensures that constructs are distinct from one another, was assessed using the Fornell-Larcker Criterion, Cross Loadings, and the Heterotrait-Monotrait Ratio (HTMT). The Fornell-Larcker Criterion compared the square root of the AVE of each construct with its correlations with other constructs, requiring that the former be higher (Fornell & Larcker, 1981). Cross-loadings were examined to confirm whether each indicator loaded more highly on its assigned construct than on any other construct. HTMT, a more recent and robust measure, provided an estimate of construct distinctiveness based on the ratio of between-trait correlations to within-trait correlations, with values below 0.85 generally indicating satisfactory discriminant validity (Henseler et al., 2015).

The Coefficient of Determination (R^2) was calculated to evaluate the explanatory power of the model, indicating the proportion of variance in the dependent variables explained by the independent variables. An R^2 value of 0.25 was considered weak, 0.50 moderate, and 0.75 substantial in the context of SEM (Chin, 1998).

To analyse the relationships among constructs and test the study's hypotheses, Partial Least Squares Structural Equation Modelling (PLS-SEM) was employed due to its suitability for prediction, theory development, and complex models involving multiple constructs and indicators. Given the study's focus on the impact of coopetition on disaster responsiveness through disaster preparedness within a dysfunctional humanitarian

environment, PLS-SEM provided a flexible and robust statistical framework that aligned with the research objectives.

Covariance-Based Structural Equation Modelling (CB-SEM) is typically employed in confirmatory research, where theoretical models are well-established. However, CB-SEM is highly dependent on large sample sizes and strict assumptions of normality, making it less ideal for studies with moderate sample sizes or datasets that deviate from normal distribution (Hair et al., 2019; Kline, 2016). Additionally, CB-SEM emphasises model fit indices such as RMSEA, CFI, and Chi-square, which are crucial for theory validation but may not align with studies focused on developing and predicting relationships among variables.

Since this study explores emerging relationships in humanitarian logistics and disaster response, the reliance of CB-SEM on predefined model structures and strict distributional assumptions could have posed challenges. A method prioritising variance explanation and predictive capabilities was therefore more appropriate. PLS-SEM effectively accommodates both formative and reflective constructs, making it a preferred choice for analysing complex relationships (Sarstedt et al., 2022). This study incorporated both construct types, which would have been difficult to estimate using CB-SEM due to its assumption that all constructs are reflective. Additionally, PLS-SEM provides robust parameter estimates even with small to medium sample sizes, unlike CB-SEM, which generally requires at least 300 observations for stable estimations (Chin, 1998; Ringle et al., 2015). Given the study's sample size of 235 respondents, an estimation method was necessary that maintained statistical power while accommodating a moderate dataset.

Another advantage of PLS-SEM is its ability to handle data that is not normally distributed. Real-world datasets in disaster management and humanitarian logistics often exhibit deviations from normality due to variations in resource allocation, logistical challenges, and the unpredictability of emergency responses (Hair et al., 2019). Since PLS-SEM does not assume normality, it provides a more reliable and adaptive framework for analysing structural relationships.

The use of bootstrapping techniques in PLS-SEM enhanced the reliability of hypothesis testing by generating confidence intervals and p-values to assess the significance of path coefficients. This resampling technique is particularly beneficial for moderate sample sizes, as it improves statistical reliability (Ringle et al., 2015). In this study, 5,000 bootstrap resamples were used to estimate the significance of relationships, ensuring robust results unaffected by sample variability.

PLS-SEM is also well-suited for analysing complex models with multiple interdependent constructs, making it ideal for evaluating the interactions between coopetition, disaster preparedness, disaster responsiveness, and dysfunctional humanitarian environments. Traditional CB-SEM models often face multicollinearity issues and challenges in model specification, particularly when dealing with interrelated constructs and moderating effects (Sarstedt et al., 2014). Since this study involved multiple interconnected constructs, a variance-based modelling approach was essential to capture the complexity of these relationships.

By employing PLS-SEM, this study effectively analysed the structural dependencies among key variables while ensuring statistical robustness and predictive accuracy. This approach enabled a comprehensive examination of the role of coopetition in enhancing

disaster responsiveness, providing valuable insights to the fields of disaster management and humanitarian logistics.

CHAPTER FOUR

DATA ANALYSIS AND RESULTS

4.1 INTRODUCTION

This chapter presents the analysis of primary data obtained from the survey of disaster firms. The chapter has two sections: the first presents the descriptive statistics of the data obtained, as well as the assessment of the measurement model, and the second section describes the Partial Least Squares Structural Equation Modelling (PLS-SEM) used to test the study's hypothesised relationships.

4.2 Response Analysis

In this section, an analysis of the responses is presented. First, the response rate (number of responses received as a percentage of total issued questionnaires) is presented and justified. Next, an examination of non-response bias is presented. Procedural and statistical measures taken to deal with non-response are discussed. In the final sub-section, missing data and treatment procedures are outlined below.

4.2.1 Response rate

The study administered questionnaires to middle and top-level managers in 400 disaster organisations in Ghana. For each firm, one available middle or top-level manager who was willing and ready to participate in the study was given a questionnaire to complete. Due to their busy schedules, each respondent was given a maximum of 30 days to complete the questionnaire. Necessary follow-ups (e.g., phone calls) were made after the 7th day, when the questionnaire was delivered, to remind respondents about the survey, encourage them to complete the questionnaires themselves, and determine when the questionnaires would be ready for collection. Out of the 400 administered questionnaires, 235 were received from respondents who completed them. The fieldwork activity lasted for 10 weeks.

Several preliminary analyses were conducted to ensure that the characteristics of the firms that responded to the survey were consistent with the target population. The study initially identified 17 respondents who held lower management positions. These responses were initially excluded, resulting in a usable sample of 218 respondents, which represents an effective response rate of 72.6%. However, during further analysis, it was observed that the factor loadings for the constructs were consistently high and within acceptable thresholds. This indicated that the responses from the 17 excluded participants could still contribute meaningfully to the analysis without compromising the reliability or validity of the findings. As a result, these 17 responses were re-included, ensuring a more comprehensive dataset that better reflects the perspectives across management levels. This adjustment enabled a more robust analysis while preserving the integrity of the results.

4.2.2 Non-response bias

Since some of the targeted respondents did not respond, it was necessary to examine the potential for non-response bias. To analyse the possibility of non-response bias, I followed the procedure of Overton (1977) to conduct an independent sample t-test comparing responses obtained within 4 weeks (early responders) with those obtained after 4 weeks (late responders). The test was to determine if there was any significant difference in the means of the various groups. The test was conducted on the respondent and firm characteristics (firm size, firm age, and years in disaster management).

The results indicate that there were no significant differences between those who responded early and those who reacted later in terms of the firm characteristics and the main variables. For all the variables studied, the test of equality of variance using Levene's test did not yield statistical significance. Thus, it can be concluded that among the variables, there is no significant difference across the groups (early respondents and late respondents).

Table 4. 1 Non-response bias test using individual and firm characteristics

Firm and respondent characteristics	*Response category*	*N*	*Mean*	*SD*	*t*	*DF*	*p*
Size (no. of employees)	Early (within 4 weeks)	130	93.23	253.06	-.718	215	.548
	Late (After 4 weeks)	105	113.19	221.13			
Firm age	Early (within 4 weeks)	130	14.20	14.345	-.992	214	.332
	Late (After 4 weeks)	105	12.64	11.720			
Years of Disaster Management	Early (within 4 weeks)	130	6.58	4.61	.744	212	.431
	Late (After 4 weeks)	105	5.73	4.24			

4.2.3 Missing data analysis and treatment

Data collected using surveys often suffer from missing values (Hair et al, 2014; Enders, 2022), which can affect the outcome of statistical analysis. (Schumaker & Lomax, 2010). Missing values are a “nuisance” that can reduce the sample size and bias the results of the study. Model estimation and hypothesis testing become problematic when data are missing. (Bagozzi & Yi, 2012; Enders, 2022). According to Schumaker & Lomax (2010), three options are available for treating missing data in a dataset: (1) deleting missing values, (2) replacing the missing data values, and (3) using robust statistical procedures that accommodate the presence of missing values.

Because this study employed a survey approach to collect data, several steps were taken to minimise the potential incidence of missing values before data collection. After collecting the data, steps are taken to deal with the missing values. To minimise the incidence of missing values in the data collection process, the researcher made a conscious appeal to the respondents to attempt to answer all relevant questions in the best manner. The aims of the study, assurances of confidentiality, and promises of anonymity were all provided to the respondents to increase the likelihood of their answering all questions. Second, the researcher made efforts to simplify all the questionnaire items and provide clear instructions on the various sections to facilitate an easy understanding of the questions and to discourage skipping questions. Finally, the time between the distribution of the questionnaire item and its retrieval was long enough to allow the respondent to respond to all questions. After the data was collected from the field, some missing values needed attention. Although there is sufficient reason to believe that the measures in place were practical, some missing values still needed to be

addressed before analysing the data. The researcher conducted missing value analysis in SPSS to identify the extent of missing variables in the data. The outcome of the missing value analysis indicated that, out of the 218 responses obtained, missing values ranged from 4 to 1 on various scales. The missing values ranged from 0.2% to 2% per item, and the overall incidence of missing variables per item was 0.5%. This can be considered acceptable, as its influence on the study's result may not be significant (Hair et al., 2014; Van et al., 2020). Given the widespread nature of the missing values, eliminating these responses would have led to considerable data loss. Therefore, the researcher, following the recommendation of Hair et al. (2014), used the expectation-maximisation (EM) algorithm in SPSS to replace the missing values. The EM was selected because it can accommodate both non-random and random missing data processes and best represents the original distribution of the values with the least bias (Hair et al., 2014).

4.3 Respondent and Firm-Level Descriptives

In this section, descriptions of firm-level and respondent-level characteristics are presented.

The respondents for this study were drawn from organisations within the disaster management sector, comprising a total of 218 participants. In terms of gender distribution, the sample was relatively balanced, with 54% identifying as male and 46% as female, as shown in Table 4.2. The age distribution indicates that a significant proportion of respondents (57.9%) were young professionals aged between 21 and 30 years, followed by 19.6% aged 31–40, 10.6% aged 41–50, and 11.9% aged 51–60. This pattern suggests a youthful workforce actively engaged in disaster management roles, supported by an average professional experience of 6.23 years. The tendency for disaster management

organisations, especially NGOs, to recruit young people as volunteers and interns likely contributes to the early progression of individuals into managerial positions (Nezhina et al., 2014).

The educational qualifications of the respondents also reflect a relatively high level of academic achievement. A plurality (40%) held a first degree, while 28.5% had attained a master's degree. Respondents with diploma or higher national diploma (HND) qualifications constituted 23% of the sample, and 7.2% had completed secondary-level education (SHS/O-Level/A-Level). Only 1.3% of respondents had achieved a PhD, indicating limited representation of advanced academic qualifications in the sector.

About professional roles, the majority of respondents (57.4%) served as operations managers—positions that are central to disaster logistics and organisational coordination. Additionally, 12.8% were deputy directors, 3.8% held directorships, 4.3% were CEOs, and 21.7% were general managers. This composition reflects a broad spectrum of leadership roles across participating organisations.

In terms of organisational affiliation, an overwhelming majority (94.8%) of respondents represented non-governmental organisations (NGOs). In comparison, governmental organisations and other types (including faith-based entities such as churches and mosques) each accounted for 2.6% of the sample. This distribution underscores the dominant role NGOs play in humanitarian disaster management efforts in Ghana.

The respondents' professional experience in disaster management ranged from 1 to 25 years, with a mean of 6.23 years and a standard deviation of 4.9 years, indicating a broad spectrum of expertise. Organisational characteristics also varied. The age of participating

firms ranged from 1 to 100 years, with an average firm age of 13.56 years (SD = 12.88). Firm size, measured by number of employees, ranged from 2 to 2,000, with an average of 101.03 employees (SD = 239.54), demonstrating significant variation in organisational scale across the sample.

Table 4.2 Respondents and Firm-level descriptive statistics

	Frequency	Percent		
Gender				
Male	127	54		
Female	108	46		
Total	**235**	**100**		
Age				
21-30 Years	136	57.9		
31-40 Years	46	19.6		
41-50 Years	25	10.6		
51-60 Years	28	11.9		
Total	**235**	**100**		
Education				
SHS/O-Level/A-Level	17	7.2		
Diploma/HND	54	23		
First Degree	94	40		
Master's Degree	67	28.5		
PhD	3	1.3		
Total	**235**	**100**		
Position				
Operations Manager	135	57.4		
Deputy Director	30	12.8		
Director	9	3.8		
CEO	10	4.3		
General Manager	51	21.7		
Total	**235**	**100**		
Organisational Type				
Governmental Organisation	6	2.6		
Non-Governmental Organisation	223	94.8		
Other	6	2.6		
Total	**235**	**100**		
	Minimum	Maximum	Mean	Std. Deviation
Years in Disaster Management	1	25	6.23	4.9

FIRM AGE	1	100	13.56	12.88
FIRM SIZE (Number of employees)	2	2000	101.03	239.54

4.4 Measurement Model Analysis

Before estimating structural relationships, the researcher must demonstrate that the measurement constructs and model possess a satisfactory level of reliability and validity. (Fornell & Larcker, 1981). The measurement model specifies the relationship between the latent construct and its measurement indicators. (Hair *et al*., 2020; Mackenzie *et al*., 2011; Hanafiah, 2020). A measurement model aims to establish the relationship between the indicators and the underlying factors or constructs. (Tabachnik & Fidell, 2013). Most often, the measurement models help to (1) specify the indicators for each construct and (2) assess the validity of the constructs. (Hair *et al*., 2014).

In this section, the measurement scales are analysed and tested for reliability and validity. First, descriptive analysis and tests for normality are presented. This is followed by a test of reliability using Cronbach's alpha technique. To establish the unidimensionality of the measurement items, exploratory factor analysis is conducted. To address potential bias in the measurement procedure, a test for standard method bias is undertaken in this section, aiming to rule out the possibility that the results are biased due to issues in the measurement procedures.

4.4.1 Descriptive analysis of measurement items and test of normality

In this section, a descriptive analysis of all the constructs is presented. Reported here are the minimum and maximum values (on the 7-point rating scale), the mean, and the standard deviation values. To test for the normality of the individual items, the skewness

and Kurtosis statistics are presented. Because the assumption of normality is key to multivariate statistics, it is relevant to check metric variables early for normality. (Kline, 2011; Tabachnik & Fidell, 2013; Knief & Forstmeier, 2021). Multivariate normality refers to the following conditions: variables are normally distributed at the univariate level, the distribution of any pair of variables is bivariate normal, and all pairs of variables exhibit linear and homoscedastic scatterplots. (Harrington, 2009). Whereas there are several aspects of normality, and it may be impractical to assess all the elements of multivariate normality, Kline (2011) argues that checking univariate normality and outliers will detect most cases of non-normality. Thus, even though univariate normality is not a guarantee of multivariate normality, all variables meeting univariate normality requirements suggest that any departure from multivariate normality remains inconsequential (Hair et al, 2014). The results presented in the tables below indicate that the distribution of scores on each item is satisfactorily normal, as both the skewness and the kurtosis indices obtained are very much within the recommended thresholds of “less than |4|” and “less than |8|” respectively (Kline, 2011).

4.4.1.1 Disaster Preparedness (DP)

Disaster preparedness was assessed using four items that measured organisational responsiveness to potential and actual disasters. The descriptive statistics revealed a general agreement among respondents across all items, with means ranging from 4.36 to 4.56, suggesting a shared acknowledgement of the importance of disaster preparedness. Variability, as indicated by standard deviations (ranging from 1.349 to 1.424), showed moderate differences in responses, reflecting diverse perspectives within the sample.

Skewness values for all items were slightly negative, indicating a tendency for respondents to provide higher scores, though the distributions were relatively symmetric. Values ranged from -0.165 to -0.431, suggesting minor left-skewness without significant departures from normality. Kurtosis values, ranging from -0.343 to -0.109, indicated slightly flatter distributions than a standard curve, with few extreme scores observed.

Table 4.3 Descriptive and Normality assessment on Disruption preparedness

		Min	Max	Mean	Std. Dev	Skewness	Kurtosis
DP1	We feel the need to be alert for possible disasters at all times	1	7	4.56	1.424	-0.165	-0.319
DP2	We recognise that disasters are always looming	1	7	4.37	1.349	-0.431	-0.236
DP3	We think a lot about how the effect of a particular disaster could have been avoided/reduced	1	7	4.44	1.387	-0.347	-0.343
DP4	After a disaster has occurred, it is analysed thoroughly	1	7	4.36	1.358	-0.103	-0.109

4.4.1.2 Coopetition (COOP)

Coopetition was measured using six items to assess the frequency and effectiveness of organisational collaboration with competitors. The descriptive statistics reveal consistent agreement among respondents, with mean scores ranging from 4.3 to 4.92. This indicates a general acknowledgement of the importance and benefits of collaboration with competitors.

The standard deviations, ranging from 1.465 to 1.682, suggest moderate variability in responses, reflecting diverse organisational perspectives on coopetition. The skewness values were consistently negative, ranging from -0.438 to -0.862, indicating a slight left skew, where respondents tended to agree more strongly with the statements. The kurtosis values, ranging from -0.412 to 0.218, indicate distributions that are close to normal, with minimal deviations in "tailedness."

Table 4.4 Descriptive and Normality assessment on Coopetition

Code	Item	Min	Max	Mean	Std. Dev	Skewness	Kurtosis
COOP1	we often find valuable partners amongst our most direct competitors	1	7	4.92	1.682	-0.862	0.075
COOP2	We collaborate with competitors to achieve common goals	1	7	4.52	1.546	-0.595	0.218
COOP3	we collaborate with competitors to access resources that our firm lacks.	1	7	4.3	1.586	-0.619	-0.412
COOP4	collaboration with competitors is effective in enhancing our competitive position.	1	7	4.54	1.491	-0.687	-0.095
COOP5	When we establish a relationship with our competitors, active collaboration is crucial to us.	1	7	4.69	1.552	-0.843	0.176
COOP6	When we establish a relationship with our competitors, active competition is crucial to us.	1	7	4.7	1.465	-0.438	-0.391

4.4.1.3 Dysfunctional Humanitarian Environment (DHE)

The Dysfunctional Humanitarian Environment (DHE) was assessed using eight items designed to capture perceptions of inefficiencies, corruption, and accountability issues in disaster management operations. Overall, the descriptive statistics revealed a general agreement among respondents regarding the presence of dysfunctions, with mean scores ranging from 4.3 to 5.65. These scores indicate that respondents recognise challenges such as transparency issues, inefficient resource utilisation, weak accountability practices, insufficient compliance systems, and corruption in humanitarian operations.

Variability in responses was moderate, as reflected by standard deviations ranging from 1.204 to 1.67. This suggests differing levels of concern among respondents while still highlighting common perceptions of dysfunction. The skewness values were slightly negative for most items, indicating a tendency toward higher levels of agreement. In contrast, the kurtosis values pointed to flatter-than-normal distributions, suggesting fewer extreme responses.

The findings suggest a consensus among respondents about the critical issues facing disaster management operations, with strong agreement particularly noted for items addressing insufficient preventive measures for misappropriation and weak systems for ensuring compliance and enforcement. The overall distribution of responses, which exhibited slight left skewness and minimal deviations from normality, indicates that the data are well-suited for further statistical analysis. These results underline significant concerns about the effectiveness and integrity of humanitarian operations, warranting attention in both policy and practice.

Table 4.5 Descriptive and Normality assessment on Dysfunctional humanitarian Environment

Code	Items	Min	Max	Mean	Std. Dev	Skewness	Kurtosis
DHE1	during disasters, the allocation of resources lacks transparency.	1	7	4.68	1.67	-0.231	-1.102
DHE2	Resources are not efficiently utilised in disaster situations.	1	7	4.51	1.531	0.04	-0.872
DHE3	Accountability practices in disaster management are weak.	1	7	4.57	1.565	-0.074	-0.835
DHE4	there are insufficient measures to prevent misappropriation during disaster management.	2	7	5.65	1.206	-0.866	0.639
DHE5	There is a lack of effective systems to ensure compliance.	2	7	5.28	1.327	-0.464	-0.371
DHE6	There is a lack of effective systems to enforce humanitarian regulations	2	7	5.18	1.204	-0.151	-0.663
DHE7	Corruption, including bribery, fund diversion, nepotism, and theft, is prevalent in our humanitarian operations.	1	7	4.67	1.601	-0.473	-0.654
DHE8	Disaster management is characterised by weaknesses and inefficiencies in addressing crisis challenges.	1	7	4.5	1.485	-0.511	-0.249

4.4.1.4 Disaster Responsiveness (DR)

Disaster Responsiveness (DR) was evaluated using four items that assessed the timeliness, appropriateness, quantity, and quality of goods provided during disaster responses. The descriptive statistics reveal a generally positive perception of disaster responsiveness among respondents, with strong agreement across all measures.

The mean scores for the items ranged from 5.43 to 5.8, indicating that respondents strongly agree with the effectiveness of their organisations' disaster responses. The measures for timeliness, appropriateness, and quality of responses showed particularly high levels of agreement. The variability in responses, as indicated by standard deviations ranging from 0.903 to 1.167, suggests that opinions were relatively consistent, with minimal divergence among respondents.

The skewness values for the items were consistently negative, indicating a left-skewed distribution where most respondents selected higher agreement levels. For instance, skewness values ranged from -0.458 to -1.597, reflecting a strong tendency toward positive ratings. Additionally, kurtosis values varied, with some items, such as timeliness and quantity of goods, showing more peaked distributions. This indicates that responses for these items were tightly clustered around the mean, with few extreme values.

Table 4.2 Descriptive and Normality assessment on Disaster responsiveness

Codes	Items	Min	Max	Mean	Std. Dev	Skewness	Kurtosis
DR1	-responses to disasters are initiated promptly to address immediate needs.	1	7	5.8	1.091	-1.597	4.603
DR2	-The goods provided in response to a disaster are appropriate and meet the specific needs of the affected individuals or communities.	3	7	5.71	0.903	-0.458	0.363
DR3	-the quantity of goods provided in response to a disruption is accurately tailored to meet the actual demand and requirements.	1	7	5.43	1.167	-1.176	3.202
DR4	-The quality of goods provided in response to a disaster meets or exceeds the necessary standards and expectations.	2	7	5.78	1.109	-1.222	1.999

4.4.2 Exploratory factor analysis (EFA)

To establish the unidimensionality of the measurement items, exploratory factor analysis was conducted in SPSS. Beyond helping to establish unidimensionality, EFA is also a good forerunner to the conduct of the more rigorous confirmatory factor analysis (CFA). The principal components extraction method was chosen, and the rotation method was varimax rotation. According to Kline (2011), principal component analysis seeks to examine the total variance and estimate factors as simple linear combinations of the measured indicators. This technique is generally considered less complex, and it is also psychometrically sound. The varimax rotation was selected because the aim was to assess the unidimensionality of the measurement items, and so an orthogonal rotation method was preferred to an oblique method. In providing a distinction between the two

methods, Field (2018) noted that while the orthogonal methods (e.g. Varimax, quartimax, equamax) rotate factors while keeping the independent, Oblique rotation methods (Direct oblimin and Promax) allow factors to correlate. The varimax rotation tries to load a smaller number of variables highly onto each factor, resulting in more interpretable clusters of factors (Field, 2018). The combination of principal component extraction and Varimax rotation has been used in several studies (see e.g. Harris & Ogbonna, 2001; Kuvaas & Dysvik, 2010; Michaelis et al., 2015; Rahimnia & Sharifirad, 2015). The EFA was conducted on all constructs under study. The extraction method employed was principal component analysis, with varimax rotation. The results are presented in Table 5.18 below. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy statistic was 0.833, which is above the minimum threshold of 0.6 (Tabachnik & Fidell, 2013; Shamsudheen & Azhar, 2021). Sampling adequacy is the ratio of the sum of correlations to the sum of squared correlations plus the sum of squared partial correlations. The result of approximately 0.828 indicates that the data is factorable and suitable for factor analysis. Bartlett's test of sphericity is significant (Approx. Chi-square = 3727.675, df = 190) at 1%. Bartlett's test of sphericity tests the null hypothesis that correlations among the items are zero. The significant test indicates that the null hypothesis is rejected and that correlations exist among the items. The results of the EFA suggest that all items loaded sufficiently on their respective scales, with loadings above 0.6.

Table 4.7 Results of Exploratory Factor Analysis

Rotated Component Matrix				
	Component			
	1	2	3	4
DP1			0.833	
DP2			0.856	
DP3			0.885	
DP4			0.819	
COOP1	0.855			
COOP2	0.88			
COOP3	0.828			
COOP4	0.864			
COOP5	0.838			
COOP6	0.755			
DHE1		0.777		
DHE2		0.876		
DHE4		0.808		
DHE5		0.68		
DHE7		0.629		
DHE8		0.747		
DR1				0.72
DR2				0.845
DR3				0.751
DR4				0.82
Extraction Method: Principal Component Analysis.				
Rotation Method: Varimax with Kaiser Normalisation.				
Kaiser-Meyer-Olkin Measure of Sampling Adequacy = .833, Bartlett's test of sphericity (Approx. Chi-Square = 3727.675, df = 190, sig = .000)				

4.4.3 Assessment of factor loading

After conducting the exploratory factor analysis, Partial Least Squares Structural Equation Modelling (PLS-SEM) was utilised to assess the factor loadings for the measurement items across four constructs: Cooperation with Competitors (COOP), Dysfunctional Humanitarian Environment (DHE), Disaster Preparedness (DP), and Disaster Responsiveness (DR). PLS-SEM is a robust analytical approach that enables the examination of complex relationships between latent variables, making it particularly

useful in exploratory studies or when working with smaller sample sizes (Hair et al., 2017). Factor loadings above 0.7 are considered sufficient to indicate that the items reliably measure the intended construct (Hair et al., 2014).

For the Cooperation with Competitors (COOP) construct, all items achieved loadings higher than 0.7. These values demonstrate that the items appropriately represent the construct of cooperation with competitors, which focuses on the dynamics of collaboration and competition in organisational strategies.

In the Dysfunctional Humanitarian Environment (DHE) construct, the factor loadings for DHE4, DHE5, DHE7, and DHE8 were 0.733, 0.715, 0.772, and 0.756, respectively. These loadings indicate that the items effectively capture key elements related to inefficiencies, lack of accountability, and resource mismanagement in humanitarian settings, all of which are central to understanding dysfunction in disaster response environments.

For Disaster Preparedness (DP), the loadings for DP1, DP2, DP3, and DP4 were 0.905, 0.915, 0.901, and 0.847, respectively. These results suggest that the items reliably represent the construct of preparedness, focusing on aspects such as the need for constant alertness, thorough post-disaster analysis, and preventive measures to mitigate the impact of future disasters.

Similarly, the Disaster Responsiveness (DR) construct, with loadings of 0.886, 0.885, 0.565, and 0.871 for DR1, DR2, DR3, and DR4, respectively, demonstrates that the items accurately reflect the concept of responsiveness. This includes the promptness, appropriateness, and quality of actions taken during disaster situations.

Table 4.8 Factor loadings

	COOP	DHE	DP	DR
COOP1	0.860			
COOP2	0.880			
COOP3	0.826			
COOP4	0.930			
COOP5	0.926			
COOP6	0.879			
DHE4		0.733		
DHE5		0.715		
DHE7		0.772		
DHE8		0.756		
DP1			0.905	
DP2			0.915	
DP3			0.901	
DP4			0.847	
DR1				0.886
DR2				0.885
DR3				0.565
DR4				0.871

4.4.4 Examination of Construct Reliability

Construct reliability was assessed using Cronbach's Alpha and Composite Reliability to ensure that the measurement items consistently reflected the latent constructs. These measures are crucial for confirming the internal consistency and reliability of the constructs.

Cronbach's Alpha is a widely recognised measure of internal consistency, with values above 0.70 indicating acceptable reliability. For Cooperation with Competitors (COOP), Cronbach's Alpha was 0.944, showing a high level of internal consistency. This suggests that the items measuring cooperation with competitors are reliable and consistent. Dysfunctional Humanitarian Environment (DHE) had a Cronbach's Alpha of 0.733, also

demonstrating strong reliability, confirming that the items related to dysfunction in humanitarian operations effectively capture the underlying construct. Disaster Preparedness (DP) achieved an Alpha of 0.914, reflecting excellent reliability, which means the preparedness items are highly consistent in measuring this construct. Similarly, Disaster Responsiveness (DR) recorded an Alpha of 0.835, indicating solid internal consistency. Across all constructs, Cronbach's Alpha values exceeded the 0.70 threshold, ensuring reliable measurement.

Composite reliability provides a more comprehensive view of construct reliability, accounting for varying factor loadings among the items. Values above 0.70 indicate sufficient reliability, with values above 0.90 suggesting excellent consistency. For coopetition (COOP), composite reliability values were 0.951 (rho_a) and 0.955 (rho_c), confirming strong reliability. Dysfunctional Humanitarian Environment (DHE) showed a composite reliability of 0.736 rho_a and 0.832 rho_c Indicating dependable and consistent measurement. Disaster Preparedness (DP) had a composite reliability of 0.920 rho_a and 0.940 rho_c A, gain confirming excellent reliability. Disaster Responsiveness (DR) had composite reliability values of 0.916 rho_a and 0.884 rho_c, demonstrating strong reliability.

All composite reliability values across the constructs exceeded the minimum threshold of 0.70, confirming the consistency of the items in measuring their respective constructs. This high level of reliability ensures that the constructs are accurately and consistently represented, providing confidence for further analysis.

Both Cronbach's Alpha and Composite Reliability measures confirm the strong reliability of the constructs in this study. The consistent and stable measurements across COOP,

DHE, DP, and DR validate that these constructs are being accurately captured, ensuring robust and reliable results in subsequent analyses.

Table 4.9 Construct validity and convergent validity

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
COOP	0.944	0.951	0.955	0.781
DHE	0.733	0.736	0.832	0.554
DP	0.914	0.920	0.940	0.796
DR	0.835	0.916	0.884	0.662

4.4.5 Examination of construct validity

Validating the measurement constructs is an essential part of the research process. (Schwab, 1980). According to Hair et al (2014), construct validity refers to the extent to which the indicators are a reflection of the theoretical latent constructs they are expected to measure. Thus, construct validity is concerned with the extent to which the construct's measures (indicators) are sufficient measures of the intended concept. That is the extent to which the measured constructs are free from measurement errors. (O'Leary-kelly & Vokurka, 1998). Four aspects of construct validity – content, convergent, discriminant, and nomological are assessed in this study, and the EFA process, together with other techniques, has been used to demonstrate these forms of validity.

4.4.5.1 Content Validity

Generally, content validity is concerned with the extent to which the measurement indicators in an instrument reflect the content universe for which the instrument is generated (Mackenzie et al., 2011). It is considered by many as the most critical test of

validity because it is not possible to specify measurement theory if one does not understand the content of the items (Hair *et al*., 2014). Most often, content validity is established using the opinion of experts, and not statistical analysis (Kline, 2011). In this study, I established content validity in three ways. First, the measurement items were adapted mainly from the literature following a critical review (Sousa & Bradley, 2006). Second, a team of peer researchers was invited to scrutinise and provide their views on the suitability of the items for the study's context. Following the guidelines of (Mackenzie et al., 2011), the peer researchers were tasked to undertake two specific analyses: (1) to assess if an individual item is representative of an aspect of the construct's domain and (2) if the items altogether capture the entire domain of the construct. Third, a pilot study was also conducted, and the feedback was used to improve the suitability of the items to the study context. Using these procedures, the researcher concluded that the items have content validity.

4.4.5.2 Convergent Validity

Convergent validity examines the degree of correlation between measures of the same construct (Hair et al., 2014). Researchers demonstrate convergent validity when the indicators of a construct have a high proportion of shared variance. In the literature, convergent validity has been shown frequently through positive and significant factor loadings (Morgan et al., 2004), Average variance extracted (AVE) values exceeding 0.5 (O'Leary-Kelly, and Composite reliability (Hong *et al*., 2020). In this study, all the retained items loaded positively and significantly on their respective constructs, and factor loadings were above 0.7. Again, all AVE values were above the threshold of 0.5. Further, the

composite reliability scores were all above 0.7. Based on these results, there is sufficient demonstration of convergent validity among the study's constructs.

4.4.5.3 Discriminant Validity

Discriminant validity is the degree to which two conceptually similar concepts are distinct (Hair et al., 2014). Thus, it is a measure of the extent to which the underlying factor of one construct differs from the others. In this study, I demonstrate discriminant validity in three ways. First, evidence from the exploratory factor analysis indicates that all items loaded respectively on their constructs, and cross-loadings were minimal (SPSS was set to ignore all loadings below 0.5). Second, the Fornell-Lacker criterion (Fornell & Larcker, 1981) was followed to compare the AVE values of the various constructs to the shared variances among the constructs. This enables an assessment of the uniqueness of each of the dimensions. It is observed that the average variances extracted were larger than the shared variances between constructs, indicating satisfactory discriminant validity (Boso, Story, & Cadogan, 2013; Fornell & Larcker, 1981). The Heterotrait-Monotrait (HTMT) ratio was also employed to assess the discriminant validity of the constructs. Discriminant validity ensures that the constructs are truly distinct from each other and that each construct measures something unique. The HTMT ratio is a more stringent and reliable criterion compared to traditional methods, particularly in assessing latent variable correlations (Henseler, Ringle, & Sarstedt, 2015). In this analysis, the HTMT values between constructs should generally be below 0.85 to confirm discriminant validity, although values below 0.90 are often acceptable in social sciences (Gold et al., 2001). These HTMT values, as presented in Table 4.11, suggest that the constructs measured in this study are distinct from each other, fulfilling the discriminant validity requirement,

thus allowing for more reliable interpretations of the relationships between the constructs in the model.

Table 4.10 Fornell Lacker

	COOP	DHE	DP	DR
COOP	0.884			
DHE	0.642	0.744		
DP	0.391	0.108	0.892	
DR	0.457	0.462	0.337	0.813

Table 4.11 Hetero Trait Mono Trait

	COOP	DHE	DP	DR
COOP				
DHE	0.772			
DP	0.415	0.192		
DR	0.464	0.551	0.381	

Table 4.12 Inter-construct correlation

	YRSDIS	FIRMAGE	FIRMSIZE	DP	COOP	DHE	DR
YRSDIS	1						
FIRMAGE	.633**	1					
FIRMSIZE	.182**	.428**	1				
DP_cp	.355**	.219**	0.063	1			
COOP_cp	.212**	-0.049	-0.086	.383**	1		
DHE_cp	.418**	.220**	0.058	.340**	.420**	1	
DR_cp	-0.033	-.271**	-.257**	.245**	.407**	.153*	1
** Correlation is significant at the 0.01 level (2-tailed).							
* Correlation is significant at the 0.05 level (2-tailed).							

4.4..4 Nomological Validity

When a construct demonstrates acceptable convergent and discriminant validities, the test of the structural model then constitutes a confirmatory assessment of nomological validity. (Anderson & Gerbing, 1988). The good fit of the PLS-SEM model indicates nomological validity in this study. (Akter *et al*., 2016; Kitsis & Chen, 2019). According to (Hair *et al*., 2014)Examining the correlations among constructs in the measurement theory can be used to assess nomological validity. This study uses both approaches in establishing nomological validity for the study. First, Table 4.12 above shows that the inter-construct correlation between the study's main variables is statistically significant. Second, the model fit results for all the estimated parameters for the PLS-SEM models are satisfactory.

4.4.5 Common method bias (CMB)

Common method bias has been acknowledged as a potential problem in all behavioural studies (Podsakoff et al., 2003). CMB is a significant source of measurement error (Podsakoff et al., 2012), and studies that utilise self-reported measures are prone to common method bias (Craighead et al., 2011). Because this study employed self-reported measures and cross-sectional data, several steps were taken to address common method bias. Following the recommendations in Podsakoff et al. (2012), procedural and statistical remedies were implemented to address the potential issues with CMB. It is worth noting that one of the key procedural remedies for addressing CMB is using different respondents or sources for the criterion and predictor variables. This method has been employed in several studies (see, e.g., Carmeli et al., 2011; Wang et al., 2015). However, that cannot be applied to this study, as it is conducted to capture the beliefs and

judgments of individuals representing firms on a single occasion (Podsakoff et al., 2012). In this study, the procedural steps taken to address CMB are outlined as follows. First, all questionnaire items were thoroughly reviewed to address ambiguous statements or questions that could cause respondents to be uncertain about how to respond to the content and may lead to idiosyncratic interpretations. Second, different scale formats (anchor labels) were used in the questionnaire item to eliminate common scale properties that may cause “probability that cognitions generated in answering one question will be retrieved to answer subsequent questions.” (Podsakoff et al., 2012). Third, respondents were assured of the confidentiality of their responses, and the promised anonymity helped to attenuate the possibility of evaluation apprehension, which could cause respondents to give responses that they consider as socially desirable.

Several statistical remedies for dealing with CMB have been reported in the literature. These include the use of Harman’s one-factor test. (Kuvaas & Dysvik, 2010; Zhang et al., 2013). In this study, I used the Harman’s one-factor test. (Cooke et al., 2016; Jyoti & Rani, 2019) To statistically test for common method bias.

Harman’s one-factor test was conducted using exploratory factor analysis. All the measurement items for the various constructs were entered in an EFA model. The principal component extraction method was selected, and the solution was unrotated. The results indicate that the first factor accounted for only 38.762% of the variance, as depicted in Table 4.13, which is below the maximum threshold of 50%. Additionally, the solution identified four factors, indicating that multiple factors exist in the data and standard method variance is not present.

Table 4.13 Results of Common Method Variance Test

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.752	38.762	38.762	7.752	38.762	38.762	4.902	24.511	24.511
2	3.003	15.014	53.776	3.003	15.014	53.776	3.795	18.977	43.488
3	2.489	12.444	66.220	2.489	12.444	66.220	3.561	17.806	61.294
4	1.894	9.469	75.689	1.894	9.469	75.689	2.879	14.395	75.689
5	.755	3.775	79.464						
6	.627	3.134	82.598						
7	.484	2.422	85.020						
8	.416	2.078	87.097						
9	.406	2.030	89.127						
10	.363	1.813	90.940						
11	.301	1.503	92.443						
12	.277	1.384	93.828						
13	.269	1.346	95.173						
14	.225	1.127	96.300						
15	.184	.919	97.220						
16	.156	.779	97.999						
17	.143	.716	98.715						
18	.101	.505	99.220						
19	.094	.472	99.692						
20	.062	.308	100.000						
Extraction Method: Principal Component Analysis.									

4.4.6 Multicollinearity

The variance inflation factor (VIF) was used to assess multicollinearity among the variables in this study. Multicollinearity was assessed by comparing the VIF values associated with the estimation against the threshold of ≤ 10, as suggested by Hair et al. (2014). From Table 4.14, VIF values are below the threshold of 10 for all variables. This indicates that multicollinearity is not a serious concern for this study.

Table 4.14 Test of Multicollinearity

Item	VIF
COOP1	3.559
COOP2	4.698
COOP3	3.253
COOP4	5.050
COOP5	6.905
COOP6	4.569
DHE4	2.358
DHE5	2.305
DHE7	1.894
DHE8	1.851
DP1	3.400
DP2	3.815
DP3	3.350
DP4	2.432
DR1	1.988
DR2	2.553
DR3	1.370
DR4	2.338

4.5 Test Of Hypothesis

The hypotheses were tested using Partial Least Squares Structural Equation Modelling (PLS-SEM) in SmartPLS, a robust tool often used to assess complex structural models and analyse relationships between latent constructs. The results for each hypothesis,

including the path coefficients, standard deviations, t-statistics, and p-values, provide insights into the significance and strength of the relationships examined in this study.

4.5.1 Hypothesis 1 (H1): Coopetition and Disaster Preparedness (DP)

The path coefficient for the relationship between coopetition and disaster preparedness was 0.401, with a t-statistic of 5.318 and a p-value of 0.000. These results suggest a strong, positive, and statistically significant relationship between coopetition and disaster preparedness. The high t-statistic (greater than 1.96) and the p-value (less than 0.05) indicate that the influence of coopetition on disaster preparedness is not due to random chance. Coopetition enhances disaster preparedness by promoting the sharing of resources, knowledge exchange, and collaborative strategies. This finding aligns with previous literature that highlights the benefits of collaboration between firms in preparing for and mitigating disaster risks (Bengtsson & Kock, 2014).

4.5.2 Hypothesis 2 (H2): Coopetition (COOP) and Disaster Responsiveness (DR)

For the hypothesis that coopetition influences disaster responsiveness, the path coefficient was 0.365, with a t-statistic of 7.060 and a p-value of 0.000, indicating a significant positive effect of coopetition on disaster responsiveness. The high t-value suggests a strong effect, while the p-value confirms statistical significance. This result demonstrates that coopetition not only influences preparedness but also significantly impacts the organisation’s ability to respond effectively during disasters. When competitors collaborate, they are likely to enhance their disaster response mechanisms, such as faster resource distribution and more efficient coordination efforts, which improve their ability to address immediate disaster needs (Hoffmann et al., 2020).

4.5.3 Hypothesis 3 (H3): The mediating role of Disaster Preparedness (DP)

Hypothesis three tests whether disaster preparedness mediates the relationship between coopetition and disaster responsiveness. The path coefficient was 0.092, with a t-statistic of 2.520 and a p-value of 0.012, indicating a significant mediating effect. The positive path coefficient suggests that coopetition indirectly influences disaster responsiveness through disaster preparedness. This mediation implies that while coopetition directly impacts responsiveness, a portion of its effect is transmitted through the increased preparedness that arises from the collaboration. This finding highlights the importance of preparedness as an intermediary process that enhances overall disaster management outcomes, reinforcing the value of cooperative strategies for disaster readiness (Paton & Johnston, 2001).

4.5.4 Hypothesis 4 (H4): Disaster Preparedness and Responsiveness

The hypothesis test result for H4, which examines the effect of Disaster Preparedness (DP) on Disaster Responsiveness (DR), provides strong empirical support for a positive relationship between the two constructs.

The standardised path coefficient ($\beta = 0.263$) indicates a positive effect, suggesting that increases in preparedness levels are significantly associated with improved responsiveness during disasters. This aligns with both theoretical expectations and previous empirical research, which argue that preparedness activities—such as early warning systems, training, pre-positioning of supplies, and stakeholder coordination—enable quicker and more effective response efforts.

The t-value of 2.839 exceeds the critical threshold of 1.96 for a 95% confidence level, and the p-value of 0.005 confirms that the relationship is statistically significant at the 0.01

level. This means the observed effect is unlikely to have occurred by chance and can be reliably interpreted as a real and meaningful connection in the population studied.

4.5.5 Hypothesis 5 (H5): The moderating role of Dysfunctional Humanitarian Environment (DHE)

Hypothesis four sought to assess the moderating role of a dysfunctional humanitarian environment on the relationship between coopetition and disaster preparedness. The results show that the path coefficient was 0.301, with a t-statistic of 3.544 and a p-value of 0.000. This result indicates a significant interaction effect, suggesting that in environments where humanitarian operations are dysfunctional (e.g., lack of transparency, misallocation of resources), the benefits of cooperation with competitors become even more critical in improving disaster preparedness. The positive coefficient suggests that coopetition helps mitigate some of the negative effects of a dysfunctional humanitarian environment, thereby enhancing preparedness efforts. This finding underscores the importance of collaboration in challenging environments, where organisational inefficiencies and corruption may otherwise hinder disaster preparedness (Maxwell et al., 2013).

The results from the PLS-SEM analysis demonstrate that cooperation with competitors plays a crucial role in enhancing both disaster preparedness and disaster responsiveness. Additionally, disaster preparedness partially mediates the relationship between cooperation and responsiveness, further emphasising the importance of preparedness in disaster management strategies. The interaction effect between a dysfunctional humanitarian environment and cooperation also highlights the value of collaboration in overcoming operational challenges in disaster settings.

These findings provide strong empirical support for the notion that cooperation among organisations, even competitors, can significantly improve disaster management outcomes, particularly in terms of readiness and effective response. Moreover, the interaction with dysfunctional environments highlights the need for cooperative efforts in environments prone to inefficiencies and mismanagement. Future disaster management strategies should therefore focus on fostering cooperation among organisations to bolster both preparedness and responsiveness, especially in complex and challenging operational settings.

Table 4.15 Summary Results

Hypothesis	Path	**Original sample (O)**	**Sample mean (M)**	**Standard deviation (STDEV)**	**T statistics (|O/STDEV|)**	**P values**
H1	COOP -> DP	0.401	0.398	0.075	5.318	0.000***
H2	COOP -> DR	0.365	0.368	0.052	7.060	0.000***
H3	COOP -> DP -> DR	0.092	0.090	0.037	2.520	0.012**
H4	DP -> DR	0.263	0.251	0.092	2.839	0.005
H5	DHE x COOP -> DP	0.301	0.288	0.085	3.544	0.000***

****** p<0.001 ** p<0.01***

4.6 Further Analysis

To further understand the relationship between coopetition and its impact on disaster preparedness and responsiveness, a subgroup analysis was conducted by classifying coopetition into low and high levels using a mean-centred deviation approach. Specifically, the mean of the coopetition construct was computed, and scores below this mean were designated as low coopetition, while scores above were classified as high coopetition. This approach aligns with established quantitative practices for subgroup

analysis of continuous independent variables (Aiken & West, 1991; Hair et al., 2021) and is particularly effective for detecting intensity-based effects of independent constructs on outcome variables.

4.6.1 High Coopetition Context

The analysis revealed that at high levels of coopetition, the path from coopetition to disaster preparedness was statistically significant (β = 0.305, p = 0.001), as was the path to disaster responsiveness (β = 0.287, p < 0.001). Additionally, the indirect effect of coopetition on responsiveness through preparedness was also significant (β = 0.125, p = 0.002). These results suggest that when organisations engage more intensively in coopetitive relationships—balancing collaboration and competition—they are more likely to build effective preparedness systems and respond more efficiently during disaster events. This aligns with cooperation theory, which posits that task interdependence and shared objectives among actors enhance mutual support and coordination efficiency (Crick et al., 2024).

4.6.2 Low Coopetition Context

In contrast, at low levels of coopetition the relationships exhibited weaker and statistically marginal relationships. The path from coopetition to preparedness was not significant (β = 0.083, p = 0.066), and the path to responsiveness was also marginal (β = 0.124, p = 0.088). The indirect effect on responsiveness through preparedness was entirely non-significant (β = 0.028, p = 0.630). These findings suggest that minimal engagement in coopetitive practices does little to foster strategic preparedness or effective responsiveness, reinforcing the cooperative theory's principle that perceived goal alignment and mutual assistance are essential for generating joint value.

4.6.3 Implications for Dysfunctional Humanitarian Environments

The additional finding that dysfunctional humanitarian environments (DHE) significantly interacted with high coopetition to predict preparedness (β = 0.265, *p* = 0.001), but not at low levels of coopetition, underscores the importance of coopetition intensity in overcoming systemic barriers. This supports co-creation theory, which emphasises that resource integration and shared governance mechanisms become more effective under high interaction conditions (Silva & Cardoso, 2025). In dysfunctional environments characterised by fragmented systems and weak trust, higher coopetition intensity appears essential for generating meaningful preparedness outcomes.

Table 4.15: Further Analysis

Path	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistic (|O/STDEV|)	P Value
High COOP → DP	0.305	0.308	0.088	3.466	0.001 **
Low COOP → DP	0.083	0.080	0.045	1.844	0.066
High COOP → DR	0.287	0.285	0.070	4.100	0.000 ***
Low COOP → DR	0.124	0.121	0.072	1.722	0.088
High COOP → DP → DR	0.125	0.127	0.040	3.125	0.002 **
Low COOP → DP → DR	0.028	0.027	0.058	0.483	0.630
DHE × High COOP → DP	0.265	0.260	0.077	3.442	0.001 **
DHE × Low COOP → DP	0.063	0.061	0.083	0.759	0.449

4.7 Chapter Conclusion

This chapter presents an in-depth analysis of the collected data, beginning with descriptive statistics of the variables, followed by an evaluation of the measurement model, and concluding with hypothesis testing using Partial Least Squares Structural Equation Modelling (PLS-SEM). The descriptive statistics provided an overview of the sample characteristics and the central tendencies, variability, and distribution of responses across the key constructs: coopetition, disaster preparedness, disaster responsiveness, and dysfunctional humanitarian environments. Measures of normality, reliability, and validity confirmed the suitability of the data for advanced statistical analyses.

The measurement model analysis demonstrated strong internal consistency and construct reliability across all constructs, with Cronbach's Alpha and composite reliability values exceeding the acceptable thresholds. Exploratory factor analysis (EFA) and subsequent PLS-SEM factor loading assessments indicated unidimensionality of the constructs, with all items loading significantly on their respective latent variables. The constructs exhibited high convergent validity, as evidenced by strong factor loadings and high composite reliability scores. Discriminant validity was also established using the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio, ensuring that each construct was distinct from others in the model.

The hypothesis testing results highlighted the critical role of coopetition in enhancing disaster preparedness and responsiveness. Coopetition was found to have a direct, positive, and significant influence on both preparedness and responsiveness, supporting hypotheses H1 and H2. The mediating role of disaster preparedness (H3) was also

established, emphasising that the impact of coopetition on disaster responsiveness is partially channelled through enhanced preparedness. Furthermore, the moderating role of dysfunctional humanitarian environments (H5) was confirmed, showing that coopetition becomes even more vital in challenging operational settings characterised by inefficiencies and corruption. Further analysis also showed that higher levels of coopetition influenced disaster preparedness and responsiveness better than lower levels of coopetition.

The findings underscore the importance of collaborative strategies, even among competitors, in improving disaster management outcomes. They also highlight the necessity of fostering cooperation in dysfunctional environments to mitigate the adverse effects of inefficiencies and mismanagement. These results provide a robust empirical basis for integrating coopetition as a central strategy in disaster preparedness and responsiveness frameworks. Future chapters will explore the implications of these findings, offering recommendations for policy, practice, and future research.

CHAPTER FIVE

DISCUSSION OF RESULTS

5.1 Introduction

The discussion section provides a comprehensive interpretation of the study's findings, contextualising them within the theoretical frameworks that underpin the hypotheses and comparing them with insights from contemporary literature. By exploring the relationships between coopetition, disaster preparedness, and disaster responsiveness, as well as the moderating influence of a dysfunctional humanitarian environment, the discussion examines the practical and theoretical implications of the findings. Drawing on Co-creation Theory, Cooperation Theory, and Institutional Theory, this section highlights how collaborative and competitive dynamics among stakeholders shape disaster management strategies and outcomes. Figure 5.1 illustrates the empirical framework, which presents the study's results.

5.2 Discussion of the Relationship between Coopetition and Disaster Preparedness

The first hypothesis of this study proposed that "coopetition positively influences disaster preparedness." Grounded in Cooperation Theory, which posits that goal interdependence fosters mutual assistance, trust, and enhanced collective performance (Deutsch, 1949), this relationship reflects the growing relevance of strategic partnerships even among competitors in the humanitarian field. In the context of disaster preparedness, cooperation theory suggests that when organisations perceive their objectives as mutually dependent, they are more likely to share knowledge, pool resources, and engage in joint planning—key factors that underpin effective preparedness strategies (Gąsiorowska-mącznik, 2020).

The study found a statistically significant and positive relationship between coopetition and disaster preparedness ($\beta = 0.401$, $p < 0.000$). This outcome reinforces the theoretical claim that interorganizational cooperation, even between competitors, leads to improved coordination, information exchange, and resource efficiency, all of which are critical in preparing for disasters. According to Adsanver et al. (2023), integrating cooperation, coordination, and collaboration—the "3Cs"—within humanitarian logistics enhances strategic alignment and decision-making capabilities, thereby bolstering preparedness outcomes.

These findings are further supported by empirical work from Fathalikhani et al. (2020), who emphasise the role of cooperative networks in enabling effective risk mapping, anticipatory logistics, and joint simulation exercises—practices vital for disaster readiness. Similarly, Schiffling et al. (2020) note that coopetitive environments foster "swift trust," a mechanism whereby competitive actors quickly develop working relationships under urgent conditions, enhancing shared preparedness outcomes without requiring deep institutional integration.

Moreover, Crick & Crick (2020) argue that coopetition enables organisations to simultaneously pursue both individual performance and collective goals, particularly in high-stakes settings such as disaster management. By embracing mutual goal facilitation—central to cooperation theory—stakeholders can enhance the quality, inclusivity, and timeliness of preparedness efforts.

From a practical perspective, this study suggests that humanitarian actors—including NGOs, government agencies, and private partners—should adopt cooperative frameworks that promote shared training, joint planning, and pooled early-warning

resources. Such initiatives create a culture of collective responsibility and readiness, in line with the foundational tenets of cooperation theory, where each actor's success is linked to the success of others.

This study confirms that coopetition—when grounded in cooperative goal interdependence—provides a powerful mechanism for enhancing disaster preparedness. Cooperation theory offers a robust lens for understanding and guiding these collaborative dynamics, particularly in resource-constrained, high-risk humanitarian environments.

5.3 Discussion of the Relationship between Coopetition and Disaster Responsiveness

The second hypothesis, *"coopetition positively influences disaster responsiveness,"* draws on theoretical frameworks such as Co-creation Theory and Cooperation Theory, which underscore the critical interplay of competition and collaboration in achieving shared goals. From the perspective of Co-creation Theory, coopetition enables a dynamic process where stakeholders collectively generate innovative solutions and optimise resource utilisation, even while competing in other domains. This approach fosters mutual value creation through shared efforts in addressing challenges while retaining the competitive drive in specific areas (Vargo & Lusch, 2016). The results of this study, showing a significant positive relationship between coopetition and disaster responsiveness ($\beta = 0.365$, $p < 0.000$), validate this theoretical stance. These findings highlight that collaboration among competitors enhances the ability to respond to disasters effectively and efficiently by leveraging shared expertise, pooling resources, and driving innovation.

From the perspective of Cooperation Theory, coopetition enhances disaster responsiveness by fostering goal interdependence, effective communication, and mutual support among organisations (Deutsch, 1980). This theory posits that cooperative behaviours, even among competing entities, lead to more effective problem-solving and more efficient resource allocation during crises. The significant positive relationship found in this study reinforces this notion, demonstrating that coopetitive dynamics facilitate swift and effective disaster responses. The theory's principles align closely with the observed benefits of coopetition in enabling stakeholders to act cohesively in the face of emergencies.

The findings of this study align with contemporary literature that underscores the pivotal role of coopetition in enhancing disaster responsiveness. Coopetition fosters a unique balance between competition and collaboration, enabling stakeholders to innovate and respond effectively to crises collectively. Guo et al. (2023) highlight that coopetition fosters both innovation and agility, crucial components of disaster responsiveness. The competitive dynamic pushes organisations to refine their operational processes, improving their efficiency and adaptability. Simultaneously, the collaborative aspect of coopetition facilitates the pooling of resources and expertise, ensuring that crisis responses are comprehensive and coordinated. These dynamics directly reflect the findings of this study, which emphasise the dual benefits of competition and cooperation in disaster management.

Further, the role of collaborative networks in disaster responsiveness has been strongly supported by recent studies. Fathalikhani et al. (2020) emphasise that coopetition strengthens these networks, enhancing streamlined communication and coordination

among diverse stakeholders. Their research demonstrates how coopetition fosters synchronised efforts, reducing overlaps and gaps in disaster responses. This is consistent with the results of this study, which underline the importance of promoting collaboration among competing entities to achieve cohesive and effective disaster management.

Another critical aspect of coopetition is its ability to enhance resource allocation during disaster responses. Merz et al. (2020) argue that coopetition enables better mobilisation and distribution of resources by encouraging shared efforts among stakeholders. This minimises delays, avoids redundancies, and ensures that resources reach affected areas more efficiently. The findings of this study corroborate this view, showing how shared resource management under a coopetition framework significantly improves the speed and effectiveness of disaster responses.

Moreover, coopetition facilitates the integration of diverse perspectives and expertise, enriching disaster response strategies. Bacon et al. (2020) emphasise that sharing knowledge and experiences among competing organisations yields innovative solutions tailored to the complexities of each disaster. Their findings complement this study by illustrating how shared learning strengthens disaster responsiveness and fosters an ecosystem of continuous improvement and adaptation.

The significant positive relationship between coopetition and disaster responsiveness observed in this study highlights the importance of leveraging collaborative dynamics among competitors. These findings validate the theoretical insights of Co-creation Theory and Cooperation Theory, which stress the role of shared goals, resource pooling, and effective communication in addressing crises. Coopetition emerges as a vital strategy for fostering innovation, overcoming resource constraints, and improving coordination during

disasters. It highlights the need to strike a balance between competition and collaboration in developing a resilient and effective disaster management framework.

Practically, organisations involved in disaster management can harness the benefits of coopetition by adopting several strategic approaches. Establishing joint response platforms can enable stakeholders to coordinate disaster responses more effectively, ensuring rapid mobilisation and efficient allocation of resources. Conducting collaborative training programs and simulation exercises can enhance inter-organisational understanding, foster trust, and improve readiness for complex disaster scenarios. Additionally, pre-arranged resource pooling agreements among competing entities can minimise delays and redundancies during disaster responses, ensuring that affected populations receive timely assistance.

By fostering coopetition, stakeholders in disaster management can strike a balance between competition and collaboration, significantly enhancing their capacity to mitigate disaster impacts and save lives. This strategic approach not only addresses immediate disaster needs but also builds a more resilient ecosystem capable of adapting to future crises. Research shows that simultaneous cooperation and competition among humanitarian organisations enhances collective effectiveness, particularly in contexts requiring swift trust and interdependence (Schiffling et al., 2020). Coopetition has also been shown to facilitate better resource sharing, donor engagement, and adaptive capabilities in disaster settings (Fathalikhani et al., 2018), as well as contribute to policy alignment and operational coordination through shared strategies and networks (Fathalikhani et al., 2020). These findings are consistent with the results of this study,

which similarly reveal that coopetition enhances preparedness and responsiveness among humanitarian actors by fostering collaboration.

5.4 Discussion of the Mediating role of Disaster preparedness in the relationship between Coopetition and Disaster Responsiveness

The findings of this study indicate that disaster preparedness mediates the relationship between coopetition and disaster responsiveness, with a significant indirect effect ($\beta = 0.092$, $p = 0.012$). This result highlights the critical role that preparedness plays in translating the collaborative and competitive dynamics of coopetition into effective disaster response strategies. From a theoretical perspective, the mediating role of disaster preparedness can be understood through the lenses of Co-creation Theory and Cooperation Theory.

Co-creation Theory posits that collaborative interactions among stakeholders lead to the co-generation of value through the shared utilisation of resources, innovation, and learning (Vargo & Lusch, 2016). In the context of this study, coopetition fosters the pooling of expertise and resources among competing organisations, creating an environment conducive to robust disaster preparedness. Preparedness then acts as a critical intermediary, enabling organisations to transform these collaborative efforts into effective and timely disaster responses. The findings validate this theoretical perspective, underscoring the importance of preparedness as a bridge that links coopetition to enhanced responsiveness.

From the perspective of Cooperation Theory, goal interdependence and collaborative problem-solving are pivotal for achieving shared objectives (Deutsch, 1980). Coopetition creates a framework where stakeholders, despite competing in certain areas, collaborate

to build strong disaster preparedness frameworks. These frameworks include comprehensive planning, resource pre-positioning, and capacity building, which directly enhance the efficiency and effectiveness of disaster responses. The significant mediating effect observed in this study corroborates the theory, emphasising the necessity of preparedness in converting coopetitive dynamics into actionable disaster management strategies.

The findings of this study align with contemporary literature that underscores the mediating role of disaster preparedness in effective disaster management. Guo et al. (2023) argue that coopetition enhances innovation and resource pooling, which are vital components of disaster preparedness. They highlight that robust preparedness strategies, cultivated through coopetition, directly translate into improved disaster responses. Fathalikhani et al. (2020) similarly emphasise that preparedness optimises resource allocation and stakeholder coordination, enabling organisations with well-established cooperative networks to respond more efficiently and effectively to crises. Merz et al. (2020) further argue that preparedness enhances organisational agility and resource optimisation, bridging the gap between collaborative efforts and efficient disaster response. Additionally, Shmueli et al. (2021) emphasise the importance of shared preparedness efforts among competing organisations, demonstrating that such frameworks lead to increased disaster responsiveness. Collectively, these studies corroborate the mediating role of preparedness identified in this study.

The interpretation of these findings underscores the essential role of disaster preparedness in linking coopetition and disaster responsiveness. While coopetition facilitates the pooling of resources, sharing of knowledge, and fostering of innovation,

these efforts must be channelled through preparedness frameworks to yield effective disaster responses. Preparedness organises and operationalises the collaborative advantages of coopetition, ensuring that stakeholders are equipped to act swiftly and effectively during crises. This dual approach validates theoretical insights from both Co-creation and Cooperation Theories, demonstrating the strategic necessity of preparedness in disaster management.

In practical terms, these findings highlight the importance of integrating disaster preparedness into coopetition strategies. Organisations should prioritise the development of robust preparedness systems, including joint training programs, shared resource inventories, and collaborative planning exercises. Such initiatives ensure that the benefits of coopetition are fully realised, enhancing disaster responsiveness and reducing the impacts of crises by adopting a holistic approach that combines coopetition with a strong focus on preparedness. By doing so, disaster management stakeholders can build resilient ecosystems capable of mitigating disaster impacts and saving lives.

5.5 Discussion of the Relationship between Disaster Preparedness and Disaster Responsiveness

The fourth hypothesis of the study posited that “disaster preparedness positively influences disaster responsiveness.” The results supported this hypothesis with a path coefficient (β) of 0.263 and a statistically significant p-value of 0.005, indicating a strong and positive relationship between preparedness (DP) and responsiveness (DR). This finding aligns with existing literature and reinforces theoretical assertions within cooperation theory, which emphasises that effective coordination and shared

understanding during the preparedness phase directly facilitate more agile and efficient responses during disasters.

From a theoretical perspective, cooperation theory posits that when organisations perceive their goals as interdependent, they are more likely to coordinate, share resources, and develop joint procedures—all of which are crucial elements in preparedness. These cooperative structures established during the preparedness phase—such as communication protocols, early warning systems, and logistics coordination—create a robust operational foundation that enables swift mobilisation during the response phase (Fathalikhani et al., 2020; Crick & Crick, 2020).

Empirical studies confirm this relationship. For instance, Schiffling et al. (2020) noted that preparedness activities, such as joint simulations and pre-disaster planning, foster trust and shared knowledge, which are activated during the response phase to enhance coordination and effectiveness. Similarly, Silva and Cardoso (2025) found that preparedness activities rooted in cooperation lead to a better alignment of roles and responsibilities among humanitarian actors, thereby reducing delays and duplication when crises occur.

The results of this study validate these insights. A coefficient of 0.263, while moderate, suggests a meaningful and practical influence of preparedness on responsiveness, emphasising that investments in preparedness—especially those built on cooperative frameworks—yield measurable improvements in response capabilities.

Practically, this underscores the importance of pre-disaster collaborations, stakeholder mapping, and capacity building in humanitarian operations. Organisations that engage in

structured preparedness are more likely to execute timely, effective, and culturally appropriate responses when disaster strikes.

5.6 Discussion of the Moderating role of Dysfunctional Humanitarian Environment in the relationship between Coopetition and Disaster Preparedness

The findings of this study reveal that the dysfunctional humanitarian environment (DHE) significantly moderates the relationship between coopetition and disaster preparedness ($\beta = 0.301$, $p = 0.000$), and these results can be fruitfully interpreted through the lens of co-creation theory. Rooted in Service-Dominant Logic (S-D Logic), co-creation theory conceptualises value not as a one-sided process but as a collaborative act that arises from the integration of resources, knowledge, and competencies across multiple stakeholders (Silva & Cardoso, 2025). This theoretical lens is especially relevant in the context of humanitarian operations, where systemic dysfunction—such as corruption, poor coordination, and inefficient resource management—often impedes effective disaster preparedness. In such environments, the traditional siloed approach to disaster management is insufficient. Instead, co-creation enables a multi-actor, value-generating framework that leverages coopetition—collaboration among competitors—to address shared vulnerabilities.

In dysfunctional humanitarian systems, no single organisation can prepare for disasters effectively on its own. Coopetition enables the pooling of complementary assets, such as logistics infrastructure, technical expertise, early warning systems, and localised

knowledge. These collective resources facilitate anticipatory planning and rapid mobilisation, compensating for institutional weaknesses (Zafar et al., 2023). For instance, multiple NGOs and government bodies might co-create regional disaster drills or share inventory data, thereby ensuring more efficient pre-disaster staging and reduced response lag (Mensah-Bonsu, 2022).

The co-creation dynamic in such challenging environments often necessitates the establishment of inclusive governance frameworks—such as inter-organisational task forces or joint command centres—that promote transparency, collaborative decision-making, and mutual accountability. These mechanisms not only facilitate resource alignment but also mitigate elite capture and bureaucratic inertia by ensuring that disaster preparedness strategies reflect both top-down policies and grassroots insights (Ha, 2023). In doing so, they create an ecosystem of shared responsibility that aligns organisational self-interest with the collective humanitarian goal.

Trust plays a central role in this co-creative process. As posited in the literature, trust is not a passive outcome but a foundational element that enables coordination and reduces transactional friction, especially in high-stakes, low-trust environments (Schiffling et al., 2020). “Swift trust” can be fostered through low-risk, early-stage collaborations such as training simulations or shared procurement systems. As these partnerships yield tangible results, they lay the groundwork for more profound interdependence and more complex joint initiatives that improve preparedness outcomes.

The study’s findings also align with Alexander’s (2017) assertion that innovation and adaptability are essential to effective disaster risk management. In environments where institutional pathways are blocked or unreliable, co-creation fueled by coopetition

becomes a crucible for innovation. Cross-sector engagement fosters knowledge exchange and iterative problem-solving, enabling adaptive strategies that respond to evolving challenges. For example, stakeholders may jointly develop blockchain-enabled platforms for supply chain tracking, ensuring transparency and real-time visibility even in highly volatile settings (Silva & Cardoso, 2025).

Thus, the moderating role of DHE reveals that the effectiveness of coopetition is deeply context-dependent. When operationalised through co-creation theory, coopetition enables humanitarian actors to collaboratively design and implement preparedness strategies that are robust to governance failures, infrastructural limitations, and cultural divides. It transforms what would otherwise be fragmented efforts into cohesive, resilient systems capable of navigating systemic dysfunction and achieving better disaster preparedness outcomes.

This study underscores the transformative potential of co-creation through coopetition in disaster-prone, institutionally weak environments. By fostering trust, aligning resources, and enabling collaborative governance, coopetition emerges not just as a strategic tool but as a foundational approach to overcoming the entrenched challenges of the dysfunctional humanitarian context.

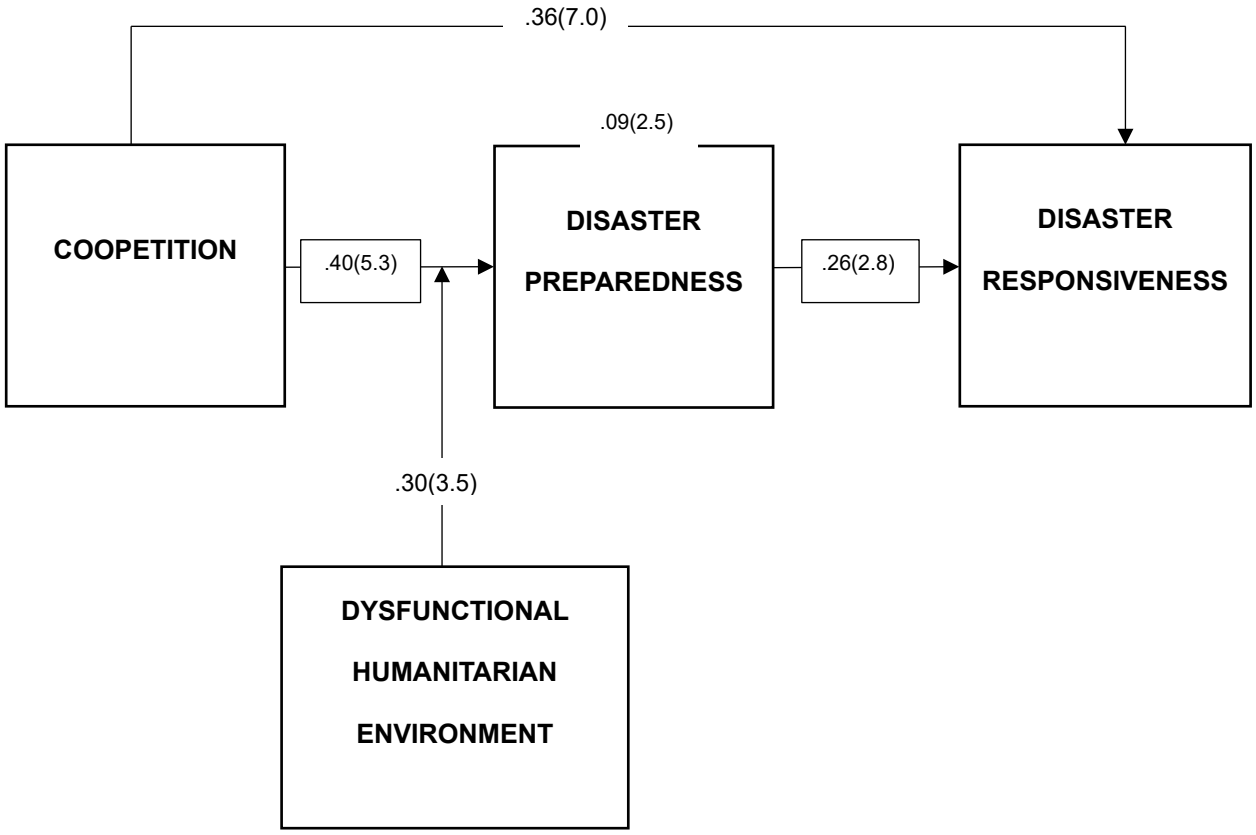

Figure 5.1: Empirical Framework

β(T-value)

5.6 Chapter Conclusion

This chapter has explored the complex interplay between coopetition, disaster preparedness, and disaster responsiveness, while also examining the moderating role of a dysfunctional humanitarian environment. Drawing from Co-creation Theory, Cooperation Theory, and Institutional Theory, the findings underscore the pivotal role of collaborative and competitive dynamics in shaping disaster management outcomes. Coopetition has been shown to significantly enhance disaster preparedness and

responsiveness by fostering innovation, resource pooling, and shared learning among stakeholders. The mediating role of disaster preparedness further highlights its critical function in translating coopetitive efforts into effective disaster responses.

The moderating influence of a dysfunctional humanitarian environment sheds light on the contextual challenges faced by disaster management stakeholders. It reveals that while dysfunctionality may hinder traditional collaborative efforts, the strength of coopetitive networks can mitigate these effects, emphasising the importance of trust, transparency, and adaptive strategies in such environments. These insights align with and extend existing literature, providing a deeper understanding of how coopetition operates within complex and resource-constrained humanitarian contexts.

The chapter concludes that integrating coopetition strategies with robust preparedness frameworks and adapting them to the specific realities of the humanitarian environment are essential for building resilience and improving disaster management practices. By aligning theoretical insights with practical applications, this study contributes to the growing body of knowledge on disaster management. It provides actionable recommendations for stakeholders to navigate the challenges of both cooperation and competition in dynamic and often dysfunctional settings.

CHAPTER SIX

CONCLUSION

6.1 Introduction

The concluding chapter provides a synthesis of the key findings and insights derived from this study, offering a comprehensive summary of the research objectives, hypotheses, and results. It highlights the theoretical contributions, practical implications, and managerial insights that have emerged from the investigation into the role of coopetition, disaster preparedness, and disaster responsiveness within dysfunctional humanitarian environments. Furthermore, it acknowledges the study's limitations and outlines directions for future research, ensuring a foundation for continued exploration and advancement in the field of disaster management. By addressing critical gaps in the literature and providing actionable recommendations, this chapter aims to encapsulate the study’s significance and its potential impact on policy, practice, and future scholarship.

6.2 Conclusion

This study examined the impact of coopetition among humanitarian organisations on disaster responsiveness, focusing on the mediating role of disaster preparedness and the

moderating influence of a dysfunctional humanitarian environment. The investigation was conducted within the context of Ghana, employing a quantitative research approach. The research design, population, sample size, and analytical techniques were meticulously crafted to provide a robust understanding of the relationships among the variables.

A descriptive research design was employed to investigate the dynamics of coopetition, disaster preparedness, and responsiveness within the constraints of a dysfunctional humanitarian environment. Data were collected through a structured questionnaire targeting a sample of 235 respondents from disaster management institutions and organisations in Ghana, including government agencies, NGOs, and private sector entities. Structural Equation Modelling (SEM) was employed to test the hypothesised relationships, providing empirical insights into the complex interplay of these variables.

The findings revealed that coopetition has a positive influence on disaster preparedness and responsiveness, supporting the study's hypotheses. This aligns with previous research indicating that coopetition fosters collaboration and competition simultaneously, leading to more resilient disaster management strategies (Schiffling et al., 2020). The study confirmed that disaster preparedness mediates the relationship between coopetition and disaster responsiveness, highlighting its essential role in translating collaborative and competitive efforts into effective response strategies. Similar findings were reported in humanitarian supply chain studies, where cooperation among NGOs significantly improved the effectiveness of disaster relief (Fathalikhani et al., 2020).

Moreover, the moderating effect of the dysfunctional humanitarian environment was evident, demonstrating that systemic inefficiencies such as theft and mismanagement influence the effectiveness of coopetitive strategies. Despite these challenges,

coopetition proved to be a resilient strategic framework for improving disaster management outcomes (Crick & Crick, 2021). The study contributes to the growing body of literature emphasising the duality of trust and distrust in coopetitive relationships, particularly in nonprofit humanitarian settings (Schiffling et al., 2020). Table 6.1 summarises the accepted/rejected hypotheses.

From a theoretical perspective, the study validated the applicability of Co-creation Theory and Cooperation Theory in the context of disaster management. These theories provide a conceptual foundation for understanding how coopetition facilitates resource pooling, innovation, and collaborative problem-solving, even in challenging environments (Meena et al., 2022). The findings emphasise the importance of leveraging cooperative networks and building preparedness frameworks to enhance responsiveness, particularly in resource-constrained settings (Worimegbe et al., 2022).

Practically, the study underscores the need for disaster management stakeholders to adopt strategic approaches that align coopetition with the realities of dysfunctional environments. Strengthening trust and accountability, implementing adaptive resource management practices, and fostering capacity-building initiatives emerged as key strategies for enhancing disaster preparedness and responsiveness (Qiu et al., 2023). These practical recommendations provide actionable insights for policymakers, humanitarian organisations, and other stakeholders seeking to improve disaster management systems. Future research should further explore the long-term impacts of coopetition on disaster resilience, especially in politically unstable and resource-scarce regions.

Table 6.1 Summary Results

Hypothesis	Path	**P values**	**Decision**
H1	COOP -> DP	0.000***	Supported
H2	COOP -> DR	0.000***	Supported
H3	COOP -> DP -> DR	0.012**	Supported
H4	DP -> DR	0.005	Supported
H5	DHE x COOP -> DP	0.000***	Supported

****** p<0.001 ** p<0.01***

6.3 Theoretical Contributions

This study makes significant theoretical contributions to the fields of disaster management, coopetition dynamics, and humanitarian logistics. By integrating Co-creation Theory and Cooperation Theory, it deepens our understanding of how coopetition functions as a strategic framework for enhancing disaster preparedness and responsiveness—especially in dysfunctional humanitarian environments.

Co-creation Theory, which emphasises value generation through shared problem-solving, innovation, and stakeholder collaboration, is extended through this study's application to disaster contexts. Findings show that coopetition among humanitarian actors promotes knowledge exchange and joint innovation, both of which are critical for improved preparedness (Dolinskaya et al., 2018; Wang et al., 2022). This supports the basis of this study as established in the literature, the operational challenges and value of strategic coordination in humanitarian logistics (Day et al., 2012; Samari & Groot, 2025). By

demonstrating how co-creation occurs under uncertainty and resource scarcity, the study affirms the theory's relevance to fragile, high-risk environments (Crick & Crick, 2020).

The study also contributes to Cooperation Theory, which focuses on interdependence and mutual benefit among stakeholders. It shows that while organisations must compete for limited resources such as funding, personnel, and access, they also need to cooperate to build shared infrastructure and early warning systems (Negi, 2022; Behl & Dutta, 2019).

A novel theoretical insight is the introduction of the dysfunctional humanitarian environment as a moderating variable between coopetition and preparedness. Whereas previous literature has often treated dysfunction in isolation, focused on corruption or fragmentation (Alexander, 2017; Tanasic & Vladimir, 2024), this study theorises and empirically tests how dysfunction actively shapes cooperative dynamics. The results reveal that dysfunction not only hinders collaboration but can also intensify the necessity for strategic alliances, contributing to the theory on crisis governance in unstable contexts.

Moreover, this study bridges coopetition and humanitarian logistics theory by showing how competitive collaboration improves logistical efficiency and last-mile delivery in disaster response. This aligns with insights on the difficulties of Humanitarian Disaster Relief Supply Chain coordination in developing countries (Ferrer et al., 2018; Mukherjee & Singh, 2020) and supports emerging calls for hybrid strategies in aid delivery.

Another key contribution is the identification of disaster preparedness as a mediating mechanism through which coopetition enhances disaster responsiveness. While preparedness is widely accepted as a crucial element of disaster management (Mohamed

Shaluf, 2008), this study clarifies its strategic role in coopetitive frameworks, showing how shared planning and communication convert into rapid, collective response capacity.

Finally, by contextualising coopetition within Ghana's humanitarian system, this study adds depth to coopetition theory in developing, resource-constrained settings. It illustrates how organisations navigate systemic dysfunction, such as weak infrastructure and regulatory inefficiency, through coopetition, thereby addressing a significant theoretical and practical gap in the literature (Fathalikhani et al., 2018).

6.4 Practical/Managerial Implications

The findings of this study provide valuable practical and managerial implications for disaster management stakeholders, humanitarian organisations, and policymakers. By analysing the role of coopetition, disaster preparedness, and responsiveness in crisis management, the research presents actionable insights for enhancing disaster response strategies, particularly in resource-constrained and dysfunctional environments.

A key implication of the study is the need to foster coopetition among humanitarian organisations. Managers in disaster relief agencies should prioritise collaboration with competitors to optimise resource allocation, leverage collective expertise, and drive innovation while maintaining competitive advantages in other areas. This dual approach enhances the efficiency of humanitarian aid delivery, ensuring that critical needs during disasters are met more effectively. Prior research indicates that coopetition among NGOs significantly improves disaster response efficiency by aligning inter-organisational goals, streamlining logistics, and reducing redundancies (Fathalikhani et al., 2018).

The study also underscores the mediating role of disaster preparedness in achieving effective disaster responsiveness. Managers should invest in robust preparedness frameworks that encompass risk assessments, pre-positioning of resources, and capacity-building initiatives. Previous research has demonstrated that preparedness strategies, particularly those leveraging coopetition, contribute to more effective responses to emergencies (Lundgren-Henriksson & Tidström, 2021).

In dysfunctional humanitarian environments such as those in developing countries, characterised by corruption, inefficiencies, and resource mismanagement, organisations must adopt transparency mechanisms to enhance accountability in resource allocation and decision-making. The integration of blockchain technologies for supply chain monitoring, along with real-time data-sharing platforms, has been proposed as a method to curb corruption and promote trust among stakeholders (Fathalikhani et al., 2020). Adaptive resource management, including flexible agreements and contingency planning, can also help organisations navigate systemic dysfunctions more effectively (Rusko, 2010).

From a policy perspective, governments and regulatory bodies should facilitate cooperative engagements among humanitarian organisations by providing institutional backing and legal frameworks. Policies that incentivise collaborative disaster preparedness initiatives, such as tax benefits and grants for joint projects, can drive increased participation in coopetition strategies (Hannachi & Coléno, 2016).

Additionally, capacity-building programs within humanitarian organisations should be strengthened. Training initiatives focused on coopetition dynamics, crisis management, and collaborative decision-making can enhance organisational effectiveness. Research

has shown that inter-agency simulations and shared training exercises enhance trust and inter-organisational coordination, which are crucial for effective disaster response (Bengtsson & Johansson, 2014).

Another critical implication is the need for technological innovation in disaster management. Organisations should leverage artificial intelligence, predictive analytics, and geographic information systems (GIS) to enhance disaster preparedness and responsiveness. Such technologies enable real-time monitoring and facilitate data-driven decision-making, leading to more effective crisis response operations (Seran et al., 2016).

Lastly, the study highlights the need for a cultural shift toward coopetition as a strategic approach in disaster management. Managers must foster an organisational mindset that values collaboration with competitors as a means of achieving shared humanitarian goals. This shift can be reinforced by leadership initiatives that promote openness, trust, and collective responsibility. Encouraging regular engagement through workshops, cooperative projects, and inter-organisational forums can enhance collaborative relationships and improve disaster response outcomes (Dorn, 2016).

6.5 Recommendations

Based on the findings of this study, several actionable recommendations can be proposed for humanitarian organisations, disaster management practitioners, and policymakers to enhance disaster preparedness and responsiveness in dysfunctional humanitarian environments. Firstly, organisations must formalise and institutionalise coopetition as a strategic approach to disaster management. Research shows that coopetition, which blends cooperation and competition, enhances efficiency in managing crises and

optimises the use of limited resources, particularly in humanitarian logistics (Fathalikhani et al., 2020; Schiffling et al., 2020). Developing clear frameworks for collaboration, including shared objectives, responsibilities, and resource-sharing mechanisms, can streamline cooperative efforts. Additionally, tools like Memoranda of Understanding (MoUs) and joint operational agreements between competing organisations should be leveraged to foster trust and ensure seamless coordination during crises.

Furthermore, prioritising investments in disaster preparedness is essential for strengthening the ability to respond effectively. This involves conducting regular risk assessments, creating comprehensive contingency plans, and ensuring the stockpiling of critical resources such as food, water, medical supplies, and equipment (Schiffling et al., 2020). Lessons learned from past disasters should also be integrated into preparedness strategies to refine approaches and enhance their effectiveness. Addressing the challenges posed by dysfunctional humanitarian environments is equally critical. Organisations must implement robust accountability measures, such as digital tracking systems and blockchain technology, to monitor resource allocation and prevent corruption and mismanagement (Correia & Baggio, 2022). Additionally, whistleblowing mechanisms should be established to encourage stakeholders to report unethical practices without fear of reprisal.

In tandem with these efforts, enhancing training and capacity-building initiatives is imperative. Disaster management personnel should receive training that focuses on improving collaborative decision-making, crisis management skills, and the effective use of technology in disaster scenarios. Joint training exercises and simulations with other organisations can further strengthen trust and improve inter-agency coordination

(Dagnino & Ritala, 2022). Additionally, leveraging advanced technologies such as artificial intelligence, geographic information systems (GIS), and predictive analytics can significantly improve disaster preparedness and responsiveness. These technologies enable real-time monitoring, data-driven decision-making, and efficient resource allocation, while digital communication platforms can enhance collaboration among stakeholders, especially in resource-constrained environments (Meena et al., 2022).

Moreover, promoting multi-stakeholder collaboration is vital. Policymakers should create an enabling environment that incentivises cooperation among humanitarian organisations, government agencies, and private sector actors (Albert-Cromarias & Dos Santos, 2020). For instance, tax incentives and grants for collaborative disaster management projects can motivate organisations to engage in cooperative efforts. Furthermore, regular forums and workshops should be held to bring stakeholders together and share best practices and lessons learned. Alongside these efforts, promoting ethical practices within organisations is essential to address issues of corruption and theft. This includes implementing strict codes of conduct, conducting regular audits, and ensuring performance evaluations (Bahar et al., 2022). Ethical leadership can play a pivotal role in fostering a culture of integrity and accountability within organisations.

Additionally, building resilient communities is crucial for disaster management. Humanitarian organisations and government agencies should engage with local communities to enhance their resilience to disasters. Through education and training on disaster risk reduction, the development of community-based early warning systems, and the active involvement of community members in disaster preparedness planning,

communities can become empowered to act as the first line of response during crises, thereby reducing the burden on humanitarian organisations (Gast et al., 2024).

Finally, adaptive resource management systems must be developed to respond flexibly to changing conditions during disasters. Pre-arranged agreements for resource sharing, dynamic inventory management, and contingency procurement plans can ensure that resources are available and distributed efficiently, even in complex and challenging environments (Ann & Chung, 2022). To complement these measures, policymakers should advocate for systemic reforms to address structural issues in disaster management. Strengthening regulatory frameworks, enforcing compliance with humanitarian standards, and enhancing oversight mechanisms are critical steps to ensure accountability and transparency. Additionally, reducing bureaucratic bottlenecks can enable faster and more effective disaster responses (Meena et al., 2022).

6.6 Limitations and Future Research Directions

This study provides valuable insights into the relationship between coopetition, disaster preparedness, and disaster responsiveness in the context of dysfunctional humanitarian environments. However, several limitations must be acknowledged, which offer avenues for future research. First, the study was conducted within the geographic and socio-political context of Ghana, which may limit the generalisability of the findings to other regions. While the Ghanaian setting provides rich insights into disaster management within a developing economy, future research could explore similar dynamics in different countries, particularly in areas with differing socio-economic or political environments, to validate and expand the applicability of the results.

Another limitation is the study's reliance on quantitative data collected through structured questionnaires. While this approach offers empirical rigour and allows for testing hypotheses, it may not fully capture the nuanced experiences, perceptions, and motivations of stakeholders operating in dysfunctional humanitarian environments. Future research could adopt mixed-methods approaches, combining quantitative surveys with qualitative interviews or case studies, to gain deeper insights into the complexities of coopetition and disaster management.

Additionally, the study focused specifically on the dysfunctional aspects of the humanitarian environment, such as theft and corruption, as moderating factors. While these factors are critical, other contextual variables, such as political instability, cultural differences, or technological constraints, may also influence disaster preparedness and responsiveness. Future studies could expand the scope to include these variables and investigate how they interact with coopetition to shape disaster management outcomes.

The study also adopted a cross-sectional design, which captures relationships between variables at a single point in time. While this design is efficient for analysing static associations, it does not account for the dynamic and evolving nature of coopetition and disaster management practices. Longitudinal studies could be conducted in the future to examine how relationships between coopetition, preparedness, and responsiveness evolve, especially in response to recurring or prolonged disasters.

Furthermore, the study's use of self-reported data from participants introduces the potential for bias, such as social desirability or recall bias, which could affect the accuracy of responses. Future research could address this limitation by incorporating objective

measures, such as third-party assessments, observational studies, or the use of real-time data analytics, to validate self-reported findings.

Lastly, while this study emphasises the moderating role of dysfunctional humanitarian environments, it does not extensively explore potential interventions or policy measures to mitigate dysfunctionality. Future research could investigate specific strategies, such as regulatory reforms, technological innovations, or capacity-building initiatives, to address dysfunctionality and enhance the effectiveness of coopetition in disaster management.

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APPENDIX

DISASTER MANAGEMENT SURVEY 2024

Dear Survey Participant,

Thank you for considering participating in this study that seeks to understand how disaster management can be enhanced to achieve better disaster responsiveness. Thus, your active participation would be very much appreciated.

The study is undertaken by **Michael Briston Adobor** a Doctoral Researcher from **Brunel University London.**

The data will not be linked to respondents and we will not contact respondents for any follow-up information or questions. All information collected for the purpose of this research will be treated in the strictest confidence. In any event where the findings are communicated, they will be communicated on an aggregate basis, and hence all information will be anonymous. Information collected will be kept for only five years in electronic form and discarded afterwards. Again, research ethics approval has been obtained from the College of Business, Arts and Social Sciences Research Ethics Committee of the university.

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Kindly note that you are responding to this survey as a member of the management team in your company (preferably, you are a CEO, Owner, director, Operations manager, general manager, Manager or Senior Supervisor).

The questionnaire has specific instructions to follow and scales to use to indicate your responses. Please reflect on your personal experience in your organisation and its operating environment to respond to the statements in the survey. Although some statements appear quite similar, they are also unique in many ways, so **kindly do well to respond to each statement**. The questionnaire will take about 20 to 25 minutes to complete and I think it will be more appropriate if you respond to it at your convenient time. All questions about the study can be directed to Michael Briston Adobor, complaints, should however be directed to the Chair of the College of Business, Arts and Social Sciences Research Ethics Committee

As a token of appreciation for participating in the study, you will receive a summary report of the key findings and recommendations from the study. We are confident that the report would be of great use to your organisation. **Please provide your email address and/or mobile number here (in case you are interested in these packages):**

_____

Once again, we are most grateful that you have decided to take the time to participate in this survey.

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Please, indicate your consent for participation here ☐ ***I agree*** ☐ ***I disagree***

SECTION A: BACKGROUND INFORMATION & DEMOGRAPHICS

INSTRUCTIONS:

This section seeks to gather some demographic data for the research. Kindly indicate your answer by typing in your answer and selecting the checking (✓) where appropriate.

1. What is your gender? Male [1] Female [2] Prefer not to say [3]

2. What is your age group? (years)

Below 21[1] 21-30 [2] 31-40 [3] 41-50 [4] 51-60 [5] above 60 [6]

3. What is your highest level of education?

No formal Education [1] Basic/primary level [2] SHS/O-Level/A-Level [3]

Diploma/HND [4] Associate Degree [5] First Degree [6] Master's Degree [7] PhD's Degree [8]

4. What is your position in your organisation?

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Operations Manager [1] Deputy Director [2] Director [3] CEO [4] General Manager [5] Manager [6] Other [7]

If other, please specify…….

5. How long have you been in Disaster Management position in this job?.....

(This includes any duty related to disaster prevention, preparedness and response)

6. How long has your organisation been in operation (in years)? ……..

7. How many people work in your organisation?.....

8. Which of the following identifies your organisation? Governmental Organisation [1] Non-Governmental Organisation [2] Other [3]

If other, please specify……

SECTION B: DISASTER PREPAREDNESS

Disasters are major concerns to lives and properties. These events are unexpected, they interrupt normal activities, and they can threaten survival. The statements below describe the orientation of your organisation towards disasters.

INSTRUCTION: Based on the respective scales provided, kindly select by checking (✓) a number that best represents your opinion on each statement.

To what extent do you agree or disagree with the statements below, using the following scales kindly select by checking (✓) a number that best represents your opinion on each statement.

1= Strongly Disagree, 2= Disagree, 3=Somewhat disagree 4=Neutral, 5= Somewhat agree 6=Agree, 7=Strongly Agree

In our organisation…	**1**	**2**	**3**	**4**	**5**	**6**	**7**
-we feel the need to be alert for possible disasters at all times	1	2	3	4	5	6	7
-we recognise that disasters are always looming	1	2	3	4	5	6	7
-we think a lot about how the effect of a particular disaster could have been avoided/reduced	1	2	3	4	5	6	7
-after a disaster has occurred, it is analysed thoroughly	1	2	3	4	5	6	7

SECTION C: COOPETITION

The humanitarian industry requires that organisations within the space compete for grants and other resources and at the same time collaborate, especially during disasters. The following statements describe your relationship with other organisations within the humanitarian sector. Please indicate your agreement with the statements.

INSTRUCTION: Based on the respective scales provided, kindly select by checking (✓) a number that best represents your opinion on each statement.

To what extent do you agree or disagree with the statements below, using the following scales *kindly select by checking (✓) a number that best represents your opinion on each statement.*

1= Strongly Disagree, 2= Disagree, 3=Somewhat disagree 4=Neutral, 5= Somewhat agree 6=Agree, 7=Strongly Agree

In our organisation…	**1**	**2**	**3**	**4**	**5**	**6**	**7**
-we often find valuable partners amongst our most direct competitors	1	2	3	4	5	6	7
-we collaborate with competitors to achieve common goals	1	2	3	4	5	6	7
-we collaborate with competitors to access resources that our firm lacks.	1	2	3	4	5	6	7
-collaboration with competitors is effective in enhancing our competitive position.	1	2	3	4	5	6	7
-when we establish a relationship with our competitors, active collaboration is very important to us.	1	2	3	4	5	6	7
-when we establish a relationship with our competitors, active competition is very important to us.	1	2	3	4	5	6	7

SECTION D: DYSFUNCTIONAL HUMANITARIAN ENVIRONMENT

The humanitarian industry faces challenges in its operations. The following statements describe some of those challenges within the industry you operate.

INSTRUCTION: Based on the respective scales provided, kindly select by checking (✓) a number that best represents your opinion on each statement.

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To what extent do you agree or disagree with the statements below, using the following scales kindly select by checking (✓) a number that best represents your opinion on each statement.

1= Strongly Disagree, 2= Disagree, 3=Somewhat disagree 4=Neutral, 5= Somewhat agree 6=Agree, 7=Strongly Agree

In our industry,	**1**	**2**	**3**	**4**	**5**	**6**	**7**
-during disasters, the allocation of resources lacks transparency.	1	2	3	4	5	6	7
-resources are not efficiently utilised in disaster situations.	1	2	3	4	5	6	7
-accountability practices in disaster management are weak.	1	2	3	4	5	6	7
-there are insufficient measures to prevent misappropriation during disaster management.	1	2	3	4	5	6	7
-there is a lack of effective systems to ensure compliance.	1	2	3	4	5	6	7
-there is a lack of effective systems to enforce humanitarian regulations	1	2	3	4	5	6	7
-corruption, including bribery, fund diversion, nepotism, and theft, is prevalent in our humanitarian operations.	1	2	3	4	5	6	7
-disaster management is characterised by weaknesses and inefficiencies in addressing crisis challenges.	1	2	3	4	5	6	7

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SECTION E: DISASTER RESPONSIVENESS

During disasters, there are diverse responses. The following statements describe some of the responses during disasters. Please indicate your level of agreement.

INSTRUCTION: Based on the respective scales provided, kindly select by checking (✓) a number that best represents your opinion on each statement.

To what extent do you agree or disagree with the statements below, using the following scales kindly select by checking (✓) a number that best represents your opinion on each statement.

1= Strongly Disagree, 2= Disagree, 3=Somewhat disagree 4=Neutral, 5= Somewhat agree 6=Agree, 7=Strongly Agree

Over the past three years,	**1**	**2**	**3**	**4**	**5**	**6**	**7**
-responses to disasters are initiated promptly to address immediate needs.	1	2	3	4	5	6	7
-the goods provided in response to a disaster are appropriate and meet the specific needs of the affected individuals or communities.	1	2	3	4	5	6	7
-the quantity of goods provided in response to a disruption is accurately tailored to meet the actual demand and requirements.	1	2	3	4	5	6	7
-the quality of goods provided in response to a disaster meets or exceeds the necessary standards and expectations.	1	2	3	4	5	6	7

Do you have any other comments? …….

……

……..

……

……..

……

……

End of Survey. Thank you.

APPENDIX B

ETHICAL CLEARANCE

College of Business, Arts and Social Sciences Research Ethics Committee
Brunel University London
Kingston Lane
Uxbridge
UB8 3PH
United Kingdom

www.brunel.ac.uk

12 March 2024

LETTER OF APPROVAL

APPROVAL HAS BEEN GRANTED FOR THIS STUDY TO BE CARRIED OUT BETWEEN 12/03/2024 AND 10/06/2024

Applicant (s): Mr Michael Adobor

Project Title: Achieving Disaster Responsiveness Under Conditions of Dysfunctional Humanitarian Environment : The Role of Coopetition and Disaster Preparedness.

Reference: 42471-LR-Mar/2024- 50382-2

Dear Mr Michael Adobor

The Research Ethics Committee has considered the above application recently submitted by you.

The Chair, acting under delegated authority has agreed that there is no objection on ethical grounds to the proposed study. Approval is given on the understanding that the conditions of approval set out below are followed:

- **If you intend to interview or survey employees of a company/organisation on their premises or if you are going to contact them via the organisation's communication facilities (e.g. emailing several people within the organisation), then you must obtain permission from their management to allow you to do so.**
- **You have clearly outlined your research intentions in your introductory letter. Therefore, when you receive permission letters/emails from the organisations, please email a copy of them to cbass-ethics@brunel.ac.uk quoting your BREO reference/ID number.**
- **If you intend to undertake field interviews, please ask your supervisor to check your interview questions beforehand. Ensure you use the full consent form which can be found at the top of the BREO page under Help>Templates> Consent Form Templates.**
- **PIS – You did not upload the amended PIS. Therefore, please ensure you use the correct version when liaising with your participants.**
- **The agreed protocol must be followed. Any changes to the protocol will require prior approval from the Committee by way of an application for an amendment.**

Please note that:

- Research Participant Information Sheets and (where relevant) flyers, posters, and consent forms should include a clear statement that research ethics approval has been obtained from the relevant Research Ethics Committee.
- The Research Participant Information Sheets should include a clear statement that queries should be directed, in the first instance, to the Supervisor (where relevant), or the researcher. Complaints, on the other hand, should be directed, in the first instance, to the Chair of the relevant Research Ethics Committee.
- Approval to proceed with the study is granted subject to any conditions that may appear above.
- The Research Ethics Committee reserves the right to sample and review documentation, including raw data, relevant to the study.
- If your project has been approved to run for a duration longer than 12 months, you will be required to submit an annual progress report to the Research Ethics Committee. You will be contacted about submission of this report before it becomes due.
- You may not undertake any research activity if you are not a registered student of Brunel University or if you cease to become registered, including abeyance or temporary withdrawal. As a deregistered student you would not be insured to undertake research activity. Research activity includes the recruitment of participants, undertaking consent procedures and collection of data. Breach of this requirement constitutes research misconduct and is a disciplinary offence.

Professor Nigar Hashimzade

Chair of the College of Business, Arts and Social Sciences Research Ethics Committee

Brunel University London