SOCIAL MEDIA AS A COMMUNICATION TOOL DURING EMERGENCIES AND DISASTERS IN GHANA

BY

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A thesis submitted in fulfilment for the requirements for

Degree of Doctor of Philosophy in Information Systems

DEPARTMENT OF INFORMATION SYSTEMS

FACULTY OF COMMERCE

UNIVERSITY OF CAPE TOWN

September 2024

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University of Cape Town

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DECLARATION

I declare that the thesis

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is my own work, and I have duly acknowledged all sources through proper referencing.

Signed by candidate

.....

Safianu Omar

ACKNOWLEDGEMENTS

The journey towards obtaining my doctoral degree has been a lengthy, challenging, and truly fascinating experience. I am profoundly grateful to everyone who has played a role in supporting and sustaining me throughout this entire transformative journey. First and foremost, I express my gratitude to Almighty God for providing strength during moments of weakness, remaining faithful even when my faith wavered, and offering hope and comfort in times of despair. All praise and worship are owed to Him.

I extend heartfelt appreciation to my supervisor, **Professor Jean-Paul Van Belle**, whose unwavering support, guidance, and patience have been invaluable throughout this academic journey. His non-judgmental approach has been a source of encouragement, allowing me to persevere. Beyond shaping the trajectory of my PhD work, he has significantly contributed to my growth as a future academic. May God bless him abundantly.

The success of this journey would not have been possible without the generous assistance I received from various individuals and institutions. I thank the disaster management organizations for graciously allowing me to use their cases for study, and I extend my appreciation to the dedicated officers who willingly participated in my research. The study's contents, including any anomalies and assumptions, are a product of our own perspective, and I have no intention of negatively portraying the efforts made by the officers in their work. Special thanks go to my home institution, Islamic University College of Ghana, for affording me the opportunity to take a break from work and pursue my studies. To my colleagues in the department who held the fort in my absence, your unwavering support is truly appreciated.

I express gratitude to the Hasso Plattner Institute at University of Cape Town (HPI@UCT) fellowship for their financial support towards my doctoral studies; without their assistance, this journey would have been practically impossible. Additionally, I thank the University of Cape Town Postgraduate Funding Office for their financial assistance. The Department of Information Systems at the University of Cape Town provided a conducive environment for my study, and I am thankful for their support.

Lastly, I want to express my deepest appreciation to my family for being my unwavering support system throughout this journey. My heartfelt thanks are extended to my wife, whose unwavering prayers, encouragement and understanding have been the pillars of strength throughout this academic venture. To my children, you have been my rocks, and I am grateful for your strength during times when Daddy couldn't always be there due to his studies. I promise to make up for all that you endured. I am forever grateful, and may God bless you abundantly.

DEDICATION

To my wife, Kalafakana, and children, Ali (Imam), Maryam (Ummi), Omar (Abba), Munawwara (Kyauta) and Mahdi, for your unwavering love, understanding, and enduring support throughout this academic journey. Your sacrifices and encouragement have been my constant motivation, and I dedicate this achievement to our shared dreams and the resilience of our family bond. You are my pillars of strength, and I am profoundly grateful for the joy and inspiration you bring to my life every day. This accomplishment is as much yours as it is mine.

ABSTRACT

Problem Statement: The integration of social media into daily life has revolutionized information dissemination and communication practices, particularly in emergency and disaster management. While current research mainly focuses on one-way communication from Emergency and Disaster Management Organizations (EDMOs) to the public, there is a significant gap in understanding the potential for two-way communication and utilizing social media as a valuable data source. This research aims to address this gap by exploring how the EDMOs can leverage social media for effective communication during crises. The study covers aspects such as information dissemination strategies, public engagement, data analysis, social media resources, dynamic capabilities, and challenges and opportunities. By bridging this knowledge gap, the research aims to enhance communication outcomes, improve preparation for disaster events, and contribute to more informed and prepared emergency and disaster management strategies.

Purpose of Study: The research focusses on examining the key role of social media as a communication tool within the context of emergency and disaster events. The study unravels the dynamics of social media communication within the realm of emergency and disaster management, emphasizing its transformative impact on information dissemination, retrieval, engaging with the public, and communication practices.

Research Methodology: The study was guided by an interpretive research philosophy, emphasizing the social construction of knowledge. Recognizing gaps in the literature regarding the use of social media in emergency and disaster communication, the qualitative interpretive approach was chosen to explore experiences and perspectives. Qualitative methods, prioritizing participant insights, were considered essential for delving into the phenomena, uncovering implicit insights, and minimizing researcher bias. Adopting an exploratory case study method focusing on five EDMOs in Ghana, the study used purposive sampling involving twenty-seven participants. The focus was on how these EDMOs responded to the 2021 Accra floods and the Covid-19 pandemic. A hybrid inductive-deductive thematic analysis, aligned with the chosen theoretical frameworks — the STREMII model, Resource-Based Theory (RBT), and the Dynamic Capability View (DCV) —, was employed to gain a detailed understanding of social media utilization in emergency and disaster communication. The chosen frameworks provided a robust foundation for discussing the complexities of social media's role in disaster communication.

Key Findings:
The study yields practical insights, emphasizing the significance of strategic planning, resource allocation, and adaptability in leveraging social media effectively. The research findings encompass the recognition of social media as a crucial information source during emergencies and disasters, with the EDMOs utilizing social media platforms for real-time updates, crowdsourcing, and expert insights. The study underscores the pivotal role of EDMOs in disseminating essential information, particularly through proactive use of social media platforms, fostering community resilience and aiding coordination efforts. The results of the

study also show that social media is a vital communication platform, allowing open dialogue between EDMOs and affected communities, addressing needs, and streamlining relief processes. Despite challenges, the study reveals that the EDMOs exhibited the capability to adapt and optimize resources dynamically, ensuring effective disaster response. The results culminated in the development of a new model which suggests a dynamic and responsive approach to disaster management through social media, aiming to enhance EDMOs' capacities and improve overall emergency and disaster outcomes.

Contribution of the Study: The research advances knowledge, theory, and practice in disaster management communication. Firstly, the research yielded eight propositions, illuminating the diverse role of social media in disaster communication. Secondly, the study operationalised the STREMII model and expanded it by proposing a more adaptive model, considering the unpredictable nature of disasters and emergencies. This new model integrates aspects related to misinformation and supporting technologies during social media disruptions. Additionally, novel information gathering and dissemination strategies were introduced to enhance the STREMII model's applicability. The study also addressed gaps in the DCV and RBT theories, emphasizing the importance of intangible resources such as social media skills, collaborative networks, expert knowledge, protocols, guidelines, and adaptive learning culture. Continuous learning capability, connecting transformative capability with adaptability, was highlighted, bridging knowledge gaps in both theories. Furthermore, the concept of ordinary capabilities was introduced, stressing the significance of internal routine activities and processes in disaster management, often overlooked in the DCV and RBT theories. While dynamic capabilities are essential, the study argues that ordinary capabilities form the foundation for effective disaster response. The research also introduced collaborative capabilities exhibited by the EDMOs, emphasizing the establishment and management of relationships with external stakeholders. This enriched both the DCV and RBT theories, portraying collaboration as a dynamic capability within the DCV framework and a valuable resource within the RBT framework.

Key Words: Social Media, Disaster Management, Emergency Management, Crisis Response, Disaster Communication Strategies, Disaster Management Organizations, Ghana

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PUBLICATIONS RELATED TO THIS THESIS

Safianu, O., & Van Belle, J. P. (2024). Disaster misinformation management: Strategies for mitigating the effects of fake news on emergency response. In A. Rocha et al. (Eds.), *Information Technology and Systems. ICITS 2024. Lecture Notes in Networks and Systems, 932* (pp. 1-11). Springer, Cham. https://doi.org/10.1007/978-3-031-54235-0_29

Safianu, O., & Van Belle, J. P. (2023). Social Signals: Harnessing Social Media Data for Disaster Management. *ITAIS 2023 Proceedings*. 16. https://aisel.aisnet.org/itais2023/16

Safianu, O., & Van Belle, J. P. (2023). When social media fails: Exploring alternative technologies for effective communication in disasters. *2023 African Conference on Information Systems and Technology Proceedings.* 7. https://digitalcommons.kennesaw.edu/acist/2023/presentations/7

*Safianu, O., & Van Belle, J. P. (2022). Social media affordances for disaster management. In P. Ndayizigamiye, H. Twinomurinzi, B. Kalema, K. Bwalya, & M. Bembe (eds) *Digital-for-Development: Enabling Transformation, Inclusion and Sustainability Through ICTs. IDIA 2022. Communications in Computer and Information Science, 1774*. Springer, Cham. https://doi.org/10.1007/978-3-031-28472-4_9

* We received the award for the best paper at this conference.

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LIST OF ACRONYMS

CAQDAS	Computer-Assisted Qualitative Data Analysis Software
DCV	Dynamic Capability View
DSL	Digital Subscriber Line
EDC	Emergency and Disaster Communication
EDMOs	Emergency and Disaster Management Organizations
GHS	Ghana Health Service
GNA	Ghana News Agency
GNFS	Ghana National Fire Service
GoG	Government of Ghana
GIS	Geographic Information Systems
ICT	Information and Communication Technology
IFRC	International Federation of Red Cross and Red Crescent Societies
IoMT	Internet of Medical Things
IRC	International Rescue Committee
IS	Information Systems
IT	Information Technology
ITU	International Telecommunication Union
MFWA	The Media Foundation for West Africa
MoH	Ministry of Health
MoI	Ministry of Interior
NADMO	National Disaster Management Organization
NGO	Non-Governmental Organization
RBT	Resource-Based Theory
SCCT	Situational Crisis Communication Theory
SMS	Short Message Service
S3M	Social Media Misinformation Management
STREMII	Surveillance, Target, Respond, Monitor, Interact, Implement
UCT	University of Cape Town
UNDP	United Nation Development Programme

UNDRR	United Nations Office for Disaster Risk Reduction
UNISDR	United Nations Office for Disaster Risk Reduction
WHO	World Health Organization
VRIN	Valuable, Rare, Inimitable, and Non-substitutable

CHAPTER ONE
THESIS OVERVIEW

1.1 Introduction

In an era defined by digital interconnectedness, the role of social media has transcended its initial purpose of fostering online communities and connecting individuals. Beyond its conventional applications, social media has emerged as a powerful and indispensable tool in the realm of emergency and disaster communication (Lam et al., 2023). The unprecedented reach, immediacy, and accessibility of social media platforms have transformed the way information is communicated during crises, offering a dynamic and real-time channel for communication. This study aims to address the existing knowledge gap concerning the utilization of social media tools by Emergency and Disaster Management Organizations (EDMOs) for effective disaster communication. Despite the acknowledged significance of social media in the context of disaster communication, there is a gap of understanding regarding the extent to which EDMOs can and do leverage these tools (Yigitcanlar, Goonetilleke & Kankanamge, 2020). As the landscape of communication continues to undergo rapid digital transformation, it becomes imperative to scrutinize how EDMOs incorporate social media into their disaster management strategies. The study seeks to explore the specific ways in which EDMOs engage with social media platforms, the challenges encountered, and the successes achieved in leveraging these tools for communication during emergencies.

This chapter provides the background and rationale for the study. This is followed by an examination of the research problem, articulation of research questions and objectives, and an elucidation of the research context. Subsequently, the chapter delves into the chosen research approach and discusses the significance of the study. The chapter ends with an outline of the thesis' distinct chapters.

1.2 Background

In recent times, the pervasive integration of social media tools into the fabric of everyday life significantly influences information retrieval and communication practices among individuals (Wong et al., 2021). This influence extends to how people access news and information, with a profound impact on emergency and disaster situations in health domains such as COVID-19 and Ebola, as well as disasters like floods, fires, and earthquakes. The widespread adoption of social media can be attributed to the increased accessibility of the internet and advancements

in mobile technology, shaping social interactions and transforming the landscape of emergency and disaster management. The utilization of social media during and after disaster events has proven instrumental in information sharing and mitigating the impact of such events (Sawaneh, Fan & Sesay, 2023).

Social media serves as an interactive computing platform fostering the exchange of information within virtual communities and networks and plays a crucial role in emergency and disaster communication (Liu, Zhang & Zhang, 2020). Popular social media platforms, including Facebook, X (Twitter) (While conducting the study, a rebranding led to Twitter adopting the name X. Nevertheless, both names, with Twitter specified in parentheses, are employed in this research), Instagram, WhatsApp and YouTube, have a growing influence on the dynamics, coverage, and information management of disasters (Acikara et al., 2023). Emergency and disaster management organizations (EDMOs) such as the police, fire service, health and ambulance service, and rescue missions, have recognized the transformative power of social. Consequently, they strategically deploy these platforms to engage with the public directly in crisis situations, incorporating them into their communication structures (Yan & Pedraza-Martinez, 2019). Thus, social media serves as a channel for communication, aiding in raising awareness during emergency situations and facilitating the maintenance of connections with people regardless of geographic limitations (Kankanamge, Yigitcanlar & Goonetilleke, 2020). The role of social media in communication during emergencies can be conceptualized in two primary ways. Firstly, it is deployed for information dissemination and feedback gathering through posts and messages (Kankanamge, Yigitcanlar & Goonetilleke, 2020). Secondly, EDMO personnel utilize social media as a tool for engagement with online social networks, involving activities such as receiving SOS messages and monitoring events to enhance situational awareness (Tudu & Shit, 2023). In Sub-Saharan Africa (SSA), various aspects of social media utilization for disaster management continue to be in their infancy, with EDMOs primarily relying on social media for passive information sharing (Lam et al., 2023).

The surge of social media as an effective tool has revolutionized communication behaviour, particularly in the context of emergency and disaster communication (Okonkwo & Awad, 2023). Individuals increasingly rely on the internet for live and up-to-date information, while disaster responders adapt to the demand for online communication. Throughout the phases of emergencies and disasters, social media can effectively coordinate and manage communication by helping in gathering valuable data, sharing vital information with victims and the wider

community, and connecting them to essential resources (Okonkwo & Awad, 2023). The proliferation of smartphones, the growing use of social media for communication, and the escalating frequency of emergency and disaster events warrant a comprehensive study to explore strategies for the optimal deployment of these technologies in communication (Amitangshu et al. 2020). As these events continue to produce damaging effects, coupled with the increasing preference for social media in communication, EDMOs must devise new communication strategies for better preparedness and response. While existing research typically explored EDMOs' use of social media to deliver disaster messages to at-risk populations, the capacity of social media as a data source is often overlooked. Integrating this aspect of social media into disaster communication has the potential of leading to more effective communication outcomes. While social media presents a myriad of possibilities for communication, its adoption by EDMOs requires the formulation of new strategies to fully harness its potentials.

Social media has transformed communication methods, enhancing one-to-one, one-to-many, and many-to-many communication approaches to unprecedented levels. Social media has become a key influencer of people's response behaviour to emergency and disaster events, facilitated by instant and remote access to information and connections with friends and family members through mobile devices. The real-time communication capacity of social media has surpassed traditional media, providing a continuous connection for individuals to access both pre- and post-disaster information (Ehnis, 2017). However, within the realm of EDMOs, research on the utilization of social media for communication and information sharing is relatively recent, primarily focused on broadcasting information (Yujie et al., 2022). Social media services extend beyond information dissemination, offering potential for two-way communication by interacting with the audience and gathering information on emergency and disaster situations (Tudu & Shit, 2023). Existing research predominantly focuses on the type of information EDMOs share throughout emergency and disaster stages, concluding that social media is primarily used for information dissemination (Subba & Bui, 2017; Majumder, Dwivedi & Khera, 2023). Thus, there is a gap on understanding how EDMOs integrate and use social for communication and reception, leading to limited insights into the integration of social media into EDMOs' communication structures and processes. The challenge faced by EDMO managers is to comprehend the dynamics and capabilities of social media and harness them for better preparation, response, and management of emergency and disaster situations.

1.3 Research Problem

The integration of social media into everyday life has undeniably revolutionized information dissemination, retrieval and communication practices. This transformative impact extends significantly to the realm of emergency and disaster management, where the utilization of social media has emerged as a critical tool for efficient communication and mitigating the consequences of crises. While existing research has primarily focused on the one-way communication aspect of social media, emphasizing its role for EDMOs to disseminate crucial information to the public, it has largely overlooked the potential for two-way communication and the valuable data source that social media platforms represent. Jiabao et al. (2021) highlight this gap, underscoring the need for a more comprehensive understanding of how organizations can leverage the interactive nature of social media for enhanced communication and reception. Despite the undeniable transformation of communication methods by social media and its crucial role in emergency situations, a significant gap persists in the understanding of how EDMOs integrate and utilize social media for effective communication while Nyamwaya et al. (2021) emphasize the lack of comprehensive insights into the dynamics and capabilities of social media within the communication structures and processes of EDMOs. This gap hinders the development of effective strategies for utilizing social media to its full potential and achieving optimal communication outcomes in emergency and disaster situations.

Addressing this problem is crucial for enhancing our understanding of the multifaceted role of social media in emergency and disaster communication. By bridging the gap through exploration of how EDMOs utilize social media for communicating disaster events, we can gain valuable insights that contribute to:

- *More effective communication outcomes:* By understanding the dynamics of social media communication within EDMOs, strategies can be developed to maximize its effectiveness in disseminating critical information, engaging with the public, and responding to inquiries and concerns.
- *Improved preparation for future events:* Through a deeper understanding of the capabilities and limitations of social media in emergency and disaster situations, EDMOs can develop better preparedness plans, effectively utilize available resources, and anticipate potential communication challenges.

Thus**,** this research aims to bridge the existing gap in knowledge by exploring the actual and potential use of social media within EDMOs. This will be accomplished through a comprehensive examination of various aspects, including:

- *Information gathering and dissemination strategies:* Analysing how EDMOs utilize social media to gather and share critical information during emergencies and disasters, including the types of content, platforms used, and effectiveness of communication. This is addressed in sections 6.4, 6.6, 8.3.1, and 8.3.2.
- *Public engagement and feedback mechanisms:* Exploring how EDMOs leverage social media for two-way communication, such as receiving public feedback, addressing concerns, and providing support, which is discussed in sections 6.8 and 8.3.7.
- *Data analysis and insights generation:* Investigating how EDMOs utilize social media data for situational awareness, understanding public sentiment, and identifying emerging trends. Sections 6.4.2 and 8.3 elaborate on this point.
- *Social media resources:* Investigating the resources that play a pivotal role in enabling the EDMOs to achieve optimal communication outcomes in the midst of emergencies and disasters. This is addressed under sections 6.3, 7.2.2 and 8.4.1.
- *Dynamic capabilities:* Studying how EDMOs dynamically harness and optimize these resources to respond effectively to the changing environments associated with emergencies and disasters. This is further discussed in sections 7.2.3 and 8.4.
- *Challenges and opportunities:* Identifying the limitations and challenges faced by EDMOs in using social media, along with potential solutions and opportunities for improvement. This point is discussed in sections 7.2.1 and 8.3.5.

This research provides valuable insights that can inform the development of effective strategies for EDMOs to optimize their use of social media in emergency and disaster communication. By bridging the gap in knowledge and fostering a deeper understanding of the dynamics of social media communication within EDMOs, the research can ultimately contribute to a more informed and prepared approach to managing future emergency and disaster events.

1.4 Research Questions and Objectives

The primary focus of this research revolves around the use of social media and its application as a communication tool in the context of emergency and disaster events. The primary question, "*To what extent is social media currently and potentially used as a tool for emergency and disaster communication?"*, serves as a guide for exploration into this landscape. Recognizing

that the use of social media involves a dynamic interplay of various factors, we acknowledge the necessity of adopting a holistic approach to comprehensively address our research objectives. The research objectives and corresponding sub-questions, as outlined in Table 1.1, are designed to encapsulate the breadth and depth of the social media phenomenon within the emergency and disaster communication context.

Understanding the nature of this dynamics requires a thorough investigation. Firstly, the research aims to unravel the current state of affairs by investigating the existing practices of emergency and disaster management organizations (EDMOs) in utilizing social media. This involves an exploration into the strategies employed, the platforms engaged, and the overall effectiveness of these endeavours. Sub-questions such as *"In what ways can social media be used for gathering emergency and disaster information?"* and "*How is information disseminated by the EDMOs during emergency and disaster events?"* provide a foundational understanding of the current landscape. Building upon this foundation, the research then endeavours to probe the impact of social media information during emergencies and disasters. We pose questions like "*How does the posted information impact on emergency and disaster risks management?"* to unravel the complexities within this context, shedding light on the role and influence of social media in crisis situations. Recognizing the evolving nature of social media, the research extends its purview to EDMOs' capabilities. We inquire into the dynamic capabilities of EDMOs investigating questions such as *"What are the current capabilities of the EDMOs in using social media?"* and "*How could their capabilities be increased?"* This forward-looking perspective ensures that the research is not only rooted in the present but also equipped to contribute insights that remain relevant in the face of rapid technological evolution.

Table 1.1 Summary of Research Sub-questions and their related Objectives.

Sub-Questions	Objectives
In what ways can social media be used for gathering emergency and disaster information?	Investigate the strategies employed for the collection of information related to emergency and disaster events.
How is information disseminated by the EDMOs during emergency and disaster events?	Analyse the modalities and effectiveness of information dissemination utilized by EDMOs through social media platforms.
How did the posted information impact on emergency and disaster risks management?	Investigate the effectiveness of information posted on social media in managing emergency and disaster risks.
What are the current capabilities of the EDMOs in using social media?	Assess the existing capabilities of EDMOs in utilizing social media for communication and information management during crises.

How could their capabilities be increased?	Develop a model for enhancing the social media capacities of EDMOs.

The research aspires to provide a holistic understanding of the utilization of social media in emergency and disaster communication. By addressing the varied dimensions encapsulated in the research objectives and sub-questions, we aim to contribute not only to the current body of knowledge but also to the development of informed strategies and practices for the effective integration of social media in emergency and disaster management.

1.5 Research Context

This study was conducted in the settings of Ghana, a nation that stands as one of the leading African countries (Turolla & Hoffmann, 2023). Within the tapestry of Ghana's socio-economic and political landscape, the study sought to shed light on emergency and disaster communication through the lens of social media. Ghana, like numerous other nations across the globe, contends with a spectrum of emergencies and disasters that pose significant challenges to its populace and infrastructure. Among the myriad challenges faced by the country, the study particularly delved into the response mechanisms related to two prominent issues: floods (2021 Accra floods) and the global COVID-19 pandemic. Floods, a recurrent concern, have been identified as a significant emergency in Ghana (Mensah & Ahadzie, 2020). The country experiences periodic heavy rainfall leading to flooding, impacting communities, infrastructure, and livelihoods (Babanawo et al., 2023; Okyere, Yacouba & Gilgenbach, 2013). Understanding how social media is utilized in disseminating information, coordinating responses, and managing risks during such events is crucial for effective disaster management (Mitcham, Taylor & Harris, 2021). Moreover, the study acknowledged the unprecedented challenges posed by the COVID-19 pandemic, which has not only tested the resilience of healthcare systems but has also necessitated innovative communication strategies (Haldane, 2021; Pradhan, 2023). Ghana, with its commitment to addressing these emergent challenges, provided a relevant backdrop for investigating how social media is employed by EDMOs in the face of a global health crisis.

Though we chose Ghana for the research, the aim is to contribute valuable insights that transcend geographical boundaries, offering a more understanding of social media's role in emergency and disaster communication. This choice was grounded in the recognition that Ghana's experiences and strategies could serve as a noteworthy reference point for other nations grappling with similar challenges. As the study unfolded in this vibrant West African

nation, it provided an opportunity to unravel the complexities of social media usage in the context of emergencies, enriching the broader discourse on effective disaster communication strategies in diverse global settings.

1.6 Research Approach

The underlying philosophical foundation guiding this study is rooted in the interpretive research philosophy, which promotes the social construction of knowledge (Kaplan & Maxwell, 2005). This philosophical perspective has found considerable application in information systems research, with interpretive approaches being employed across various facets, including system design, information systems management, and the social implications of information systems (Walsham, 2011). Given the nature of the research questions at hand, a qualitative method utilizing an interpretive approach was deemed essential to unravel the complexities inherent in the use of social media as a tool for communicating emergencies and disasters. The rationale for choosing an interpretive research philosophy is grounded in the identified gaps in the literature, revealing a limited understanding of the full extent to which social media is currently being used and can potentially be employed in the context of emergency and disaster communication. The interpretive approach, with its emphasis on exploring the social constructions of knowledge, aligns with the need to delve into the subjective experiences and perspectives of individuals involved in emergency and disaster management. Qualitative methods, within the interpretive paradigm, were deemed indispensable for this study due to the unique opportunities they offer. Unlike quantitative approaches, qualitative methods prioritize the insights and perspectives of research participants, yielding rich and in-depth data. This depth is particularly critical when exploring complex phenomena such as the values that shape the deployment of social media in crisis communication. The study recognized that social media may not overtly display certain values, making it essential to uncover implicit values that may influence the use of social media during emergencies and disasters. Qualitative methods, as suggest by Bryman (2012), are well-suited to analyse the theories and concepts that emerge organically from the data, providing a nuanced understanding of the subject matter. Furthermore, the qualitative approach was deemed necessary to mitigate researcher bias and assumptions. In the realm of social media, where diverse perspectives converge, understanding the values that shape communication during emergencies requires a methodological approach that allows the voices of participants to carry weight. By adopting a qualitative method, this study aimed to minimize the imposition of

preconceived notions and allow the authentic views of participants to shape the interpretation of results.

This study adopts an exploratory case study research method with the goal of gaining a detailed understanding of the research problem. Through purposive sampling, the study focused on five EDMOs in Ghana, selecting 27 participants representing diverse roles within these organizations. The chosen participants included heads of communication units, operations assistants, and personnel specializing in research and information and communication technology (ICT). A hybrid inductive-deductive thematic analysis was employed to offer a comprehensive narrative from the perspective of emergency and disaster managers regarding the utilization of social media as a communication tool during disasters and emergencies. This analytical approach involves deductive thematic analysis aligned with the theoretical frameworks, specifically the STREMII model (Stewart & Wilson, 2016), Resource-Based Theory (RBT) (Barney, 1991), and the Dynamic Capability View (DCV) (Teece, 2007a). While deductive thematic analysis facilitates structured data analysis, inductive thematic analysis allows for the identification of emerging themes directly from the data. The incorporation of these theoretical frameworks is justified by the belief that they provide a robust foundation for discussing the role of social media and its associated resources in the realm of emergency and disaster communication. The STREMII model, the RBT theory, and the DCV collectively offer a comprehensive framework for understanding the complexities of social media utilization in crisis communication.

1.7 Significance of the Study

The significance of this study lies in its potential to contribute valuable insights to both academic scholarship and practical applications in the field of emergency and disaster management. Several key aspects highlight the importance and relevance of the research:

- *Advancement of Academic Knowledge:* This study addresses a notable gap in the existing literature by adopting an exploratory case study approach, delving into the dynamics of social media utilization in emergency and disaster communication. The findings have the potential to extend theoretical frameworks and contribute to the academic discourse on crisis communication and information management.
- *Practical Implications for Emergency and Disaster Management Organizations* (EDMOs): The research outcomes offer practical implications for EDMOs in Ghana and beyond. By understanding the experiences, challenges, and opportunities

associated with the use of social media during emergencies, organizations can refine their strategies, enhance communication protocols, and improve overall disaster response effectiveness.

- *Strategic Framework Development:* The study's exploration of the STREMII model, the RBT theory, and the DCV theory provided the key components for an integrated strategic framework to comprehend the role of social media and its associated resources in emergency and disaster communication. The proposed framework can serve as a guide for policymakers, practitioners, and researchers in developing strategies for leveraging social media in crisis situations.
- *Capability Building and Training Initiatives:* The insights derived from this study can inform capability-building initiatives and training programs for emergency and disaster management professionals. Understanding the specific needs and challenges faced by the EDMOs can guide the development of targeted training modules, ensuring that personnel are well-equipped to harness the full potential of social media in their communication endeavours.
- *Global Relevance:* While the study focuses on the Ghanaian context, its findings hold broader relevance for other regions facing similar challenges. The universality of crises such as floods and pandemics makes the study applicable to a global audience, providing valuable comparative insights for emergency and disaster management practices worldwide.
- *Informing Policy Decisions:* Policymakers in the field of emergency and disaster management can benefit from the study's findings in shaping policies that facilitate effective and ethical use of social media during crises. This includes considerations related to information gathering and dissemination, public engagement, and the integration of technological advancements into emergency response protocols.

1.8 Organization of Thesis

The thesis is structured across nine chapters, with the introductory *Chapter 1* offering the research overview. This opening chapter outlined the research problem and underscores the significance of delving into the utilization of social media for emergency and disaster communication. It introduced primary and secondary research questions along with their corresponding objectives and emphasizes the importance of the study. Acknowledging the social media dynamics in this context, the chapter set the stage for a detailed exploration in the subsequent chapters. Chapters 2 and 3 focus on a review of the literature. *Chapter 2* delves into

the interrelationship between disaster, emergency, and crisis, explaining why these terms are used interchangeably and identifying gaps in existing literature. It explores approaches to disaster management, emphasizing the considerations guiding the efforts of disaster management organizations and stakeholders. *Chapter 3* concentrates on communication within the context of emergencies and disasters. It explores various facets, including innovation and adoption of technology in disaster communication, information flow, risk communication, community engagement, and the communication capacities of disaster management organizations. *Chapter 4* discusses the theoretical foundations of the research, covering the STREMII Model, RBT theory, and DCV theory. These theories are chosen for their relevance to the processes, resources, and capabilities inherent in the dynamics of social media utilization in disaster communication. *Chapter 5* is dedicated to the philosophical assumptions and methodological decisions that shape the study. This includes justifications for case selection, explanations of research methods and instruments, details on sampling, analysis, and ethical considerations and procedures. *Chapters 6* and *7* present the findings based on the STREMII Model, RBT theory, and DCV theory, as well as major themes derived from the inductive-deductive analysis of data. *Chapter 8* is discussion of the findings, which establishes a theoretical foundation for addressing the research questions, highlighting the role of social media in disaster and emergency communication. It offers insights into how EDMOs can leverage these platforms to enhance public safety and risk management while suggesting eight theoretical propositions. Finally, *Chapter 9* concludes the research, underscoring its theoretical and practical contributions. It explores implications for both research and practice, addressing limitations and providing recommendations for future research endeavours. This concluding chapter encapsulates the holistic journey of the thesis, offering an understanding of the complexities surrounding social media's role in emergency and disaster communication.

CHAPTER TWO
DISASTERS, EMERGENCIES AND CRISES

2.1 Introduction

Emergencies, disasters, and crises constitute critical facets of the human experience, demanding comprehensive study and understanding. The significance of studying these phenomena is rooted in the profound impact they have on individuals, communities, and societies at large. This section introduces these facets emphasizing their pervasive influence on human life. The importance of studying these incidents lies in their unpredictability, from calamities such as floods to man-made crises like pandemics, they can strike with little warning, causing widespread disruption. By reviewing these occurrences and their management in this chapter, we gain valuable insights into the underlying factors contributing to vulnerability and resilience which are instrumental in this research as it helps in shaping discussions in subsequent chapters.

2.2 Definition of Key Terms and Concepts

This section discusses the concept of disaster, emergency and crisis and explores the interrelationship between the three terms as used in this research.

2.2.1 Disaster

A disaster represents a profound and often overwhelming disruption in the normal functioning of a community, surpassing its inherent capacity to manage and recover using existing resources (Alexander, 2002; UNISDR, 2009). These events can manifest in various forms, stemming from events like earthquakes, floods, and wildfires, or from human-induced incidents such as technological accidents and acts of terrorism (Clarke & Parris, 2019). The consequences of disasters are far-reaching, extending beyond immediate physical damage to encompass a broad spectrum of challenges that test the resilience of affected populations. The toll can be profound, with lives lost, communities shattered, and economies crippled, underscoring the severe and multifaceted nature of these occurrences (Lorenzoni et al., 2020).

2.2.2 Emergency

An emergency, as defined by Lorenzoni et al. (2020), is a serious, unexpected, and often risky situation that demands immediate action which can arise from a myriad of sources, encompassing both natural and human-induced events. This broad scope underscores the

diverse nature of challenges that may confront individuals, communities, and emergency responders. Understanding and effectively managing emergencies is crucial, given their potential to exert a profound impact on both human lives and property. Events such as earthquakes, floods, and severe weather conditions can swiftly transform routine situations into emergencies, testing the preparedness and response capabilities of affected entities. Conversely, human-caused incidents, including industrial accidents and acts of violence, further contribute to the complex landscape of emergencies, necessitating swift and strategic intervention. The ramifications of emergencies extend beyond the immediate event, often leaving a lasting imprint on the affected individuals and communities.

2.2.3 Crisis

A crisis is a time of intense difficulty or danger (Lorenzoni et al., 2020). This can manifest in various contexts, ranging from the personal sphere to the organizational and societal levels (Clarke & Parris, 2019) often necessitating swift and well-coordinated actions to mitigate their impact. Example, public health crises, as exemplified by pandemics, present acute threats to human well-being, demanding rapid and comprehensive responses to contain the spread of diseases and protect public health (Lorenzoni et al., 2020). The impact of crises extends beyond immediate challenges, often leaving enduring effects on individuals and organizations. The need for a rapid and effective response is paramount, as delays or inadequacies in addressing crises can exacerbate their consequences.

In this research, the terms *disaster*, *emergency*, and *crisis* have been used interchangeably. While there are blurred distinctions among these terms as shown in Table 2.1, they also share significant similarities. The interchangeable use of these terms reflects the complex and interconnected nature of events that fall within the purview of disaster management, emergency response, and crisis mitigation.

Table 2.1 A Summary of Differences Between Disasters, Emergencies, and Crises.

Feature	Disaster	Emergency	Crisis
Scale	Large-scale event that affects a community or region	Smaller-scale event that affects a specific location or group of people	Can be large-scale or small-scale
Timeline	Slow onset and long duration	Sudden onset and short duration	Can have a sudden onset and short duration, or a slow onset and long duration

Impact	Widespread damage, loss of life, and economic disruption	Significant impact on people and property	Significant impact on people and organizations
Response	Requires a long-term recovery effort	Requires a rapid and coordinated response	Requires a strategic and well-planned response

2.3 Disaster and Emergency Management

Disaster management is the organization, planning and application of measures preparing for, responding to and recovering from disasters. Disaster management, as described by FEMA (2010) and widely adopted in the literature (e.g., Chikoto, Sadiq & Fordyce, 2012; Ngamassi, Ramakrishnan & Rahman, 2016; Islam & Chik, 2011) has been generally classified into four phases, occuring in a cycle, which are *mitigation, preparedness, response, and recovery* and illustrated in Figure 2. The first phase, *mitigation*, is aimed at minimizing long-term risks to both people and properties in the face of potential disasters (Ngamassi, Ramakrishnan & Rahman, 2016; FEMA, 2010;). This phase involves strategic actions and processes implemented well in advance of any disaster occurrence, with the goal of protecting lives, safeguarding valuable assets, and reducing the economic impact of disasters. Mitigation strategies encompass public education initiatives to enhance community awareness and preparedness, as well as vulnerability analysis to systematically assess and address specific weaknesses. By leveraging multidisciplinary expertise, mitigation tailors measures to the unique challenges of a region, considering factors such as geography, culture, and socio-economic conditions. Ultimately, the mitigation phase plays a crucial role in creating resilient communities capable of withstanding and recovering from disasters, contributing significantly to the overall success of the disaster management.

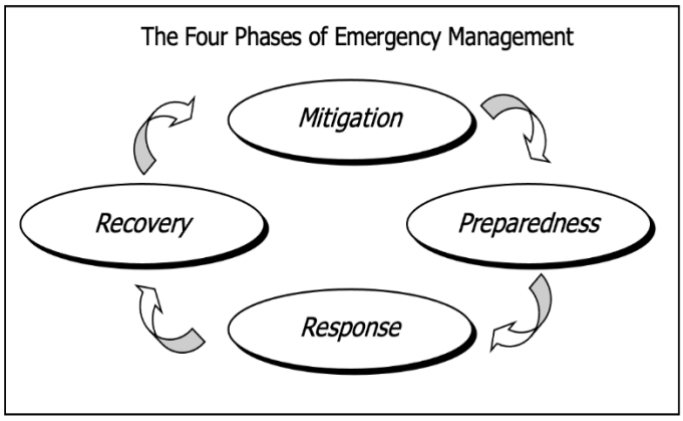

Figure 2.1 Four Phases of Disaster Management (FEMA, 2010)

The second phase of disaster management, *preparedness*, acknowledges the inherent challenges in completely mitigating all potential casualties and risks during disasters. Given this reality, preparedness becomes crucial in reducing the overall impact of disasters. The objective of disaster preparedness plans is to establish a sufficient level of readiness to effectively handle any disaster situation (UNISDR, 2010). This involves enhancing the managerial and technical capacities of communities, organizations, and governments (Srinivas, 2015). Logistical readiness is a key component, requiring the implementation of sound procedures, response mechanisms, public education, and the development of both short-term and long-term strategies, including the establishment of early warning systems. The effectiveness of the preparedness phase is contingent upon the availability of information on hazards, emergency risks, and appropriate countermeasures. The successful implementation of preparedness measures relies on the extent to which the general public, government agencies, and private organizations can access and utilize this information to enhance their capability to respond effectively to disasters (Srinivas, 2015).

The third phase of disaster management, the *response* phase, is activated when a disaster is imminent or immediately after it occurs (FEMA, 2010). This phase primarily involves the execution of strategies developed during the preparedness phase (Ngamassi, Ramakrishnan & Rahman, 2016). It commences with a thorough assessment of the situation, followed by the provision of assistance to affected population and the restoration of critical services with the primary objective to deliver immediate assistance to sustain life and bolster the morale of affected communities (FEMA, 2010; Kunguma & Skinner, 2017; Ngamassi, Ramakrishnan & Rahman, 2016). The response phase is characterized by swift and coordinated efforts to address the urgent needs of those impacted by the disaster, with a focus on restoring essential services and facilitating a rapid recovery process.

The fourth and final phase of disaster management is the *recovery* phase, which aims to facilitate the restoration of systems and community activities to normal functioning (Ngamassi, Ramakrishnan & Rahman, 2016). Recovery plans encompass both short-term and long-term measures, focusing on returning support systems to minimum operating standards, enhancing the quality of life, reconstruction efforts, improving public information, safety and health education, and conducting economic impact analyses. The recovery phase involves a multifaceted approach that includes information services and resource allocation, such as data gathering related to rebuilding and documentation of lessons learned from the disaster

(Srinivas, 2015). Importantly, the information gathered during the recovery phase serves as a valuable resource for enhancing future mitigation and preparedness efforts, ultimately contributing to a reduction in vulnerability to potential disasters. This phase represents a comprehensive and strategic endeavour to not only rebuild and rehabilitate but also to learn from the experiences of the disaster and fortify communities against future challenges (Srinivas, 2015).

Critically reflecting on the four-phase model of disaster management reveals several limitations that have been highlighted in the literature. While this model is widely used and provides a structured approach to disaster management, it is not without its criticisms. One significant limitation is its linear and cyclical nature, which may oversimplify the complexities of real-world disaster scenarios. Disasters often do not follow a neat sequence of phases; instead, they can involve overlapping and simultaneous challenges that require more flexible and adaptive approaches (Bosher, Chmutina & van Niekerk, 2021). For instance, mitigation and recovery efforts can occur concurrently, particularly in protracted crises where communities must rebuild while still facing ongoing threats. Moreover, the model has been critiqued for its inadequate consideration of the interconnectedness and dynamism of disaster risks. The emphasis on distinct phases may obscure the fact that disaster management is an ongoing, iterative process where lessons learned in one phase should continuously inform and adjust strategies in others (Bosher, Chmutina & van Niekerk, 2021). This perspective is increasingly important in the context of climate change, where disaster risks are evolving rapidly and unpredictably. Additionally, the model has been criticized for potentially reinforcing a top-down approach to disaster management, which may overlook the importance of community-based and locally-driven initiatives. While it emphasizes preparedness and response, it sometimes fails to account for the varying capacities and vulnerabilities of different populations, leading to strategies that might not be universally applicable or effective (Ngamassi, Ramakrishnan & Rahman, 2016). To address these limitations, researchers like Bosher, Chmutina and van Niekerk (2021) have introduced the concept of the disaster continuum, which offers a more fluid and integrated approach. This continuum recognizes that disaster management phases are interconnected and often overlap, necessitating a more holistic and adaptable response. The continuum model also highlights the importance of continuous learning and adaptation, challenging the traditional four-phase model's rigid structure.

2.4 Disaster Management Dynamics in the African Context

Disaster management in Africa, including Ghana, is shaped by a unique set of challenges and opportunities. The continent's vulnerability to a wide range of disasters—such as floods, droughts, epidemics, and conflicts—is exacerbated by factors like rapid urbanization, climate change, political instability, and socio-economic inequalities (Mulugeta & Simelane, 2016). In Ghana, the most common disasters include floods, droughts, and disease outbreaks. Flooding, particularly in urban areas like Accra, is a recurrent problem, often exacerbated by poor urban planning, inadequate drainage systems, and indiscriminate waste disposal (Yin et al., 2021). Rural areas, on the other hand, are more prone to droughts, which affect agricultural productivity and food security. Ghana's National Disaster Management Organization (NADMO) is the primary agency responsible for coordinating disaster management efforts. NADMO's mandate includes disaster prevention, preparedness, response, and recovery. Traditional knowledge and community-based approaches play a crucial role in disaster management, especially in rural areas. Local communities often rely on indigenous practices and social networks to cope with disasters (Yin et al., 2021).

Disaster management in Africa, and specifically in Ghana, requires a multifaceted approach that addresses both the immediate and underlying causes of disasters. While the disaster management phases of *mitigation, preparedness, response,* and *recovery* have been extensively studied and applied in the context of the developed world, their implementation in the African context, such as Ghana, reveals a different outlook. Contrary to the linear and cyclical nature often portrayed, our findings indicate that these phases do not neatly follow a sequential pattern in the African context; instead, they tend to overlap, creating a more interconnected framework, as depicted in Figure 2.2. This observation is particularly pronounced in the concentration of disaster management efforts in the response phase especially when using social media for its communication aspects. In many African countries, the limitations in resources, infrastructure, and institutional capacities often necessitate a more adaptive and flexible approach to disaster management (Awuh, Mallick & Mairomi, 2022). Indeed, our findings show that the challenges of addressing immediate needs during and after a disaster can lead to a convergence of mitigation, preparedness, response and recovery efforts, blurring the traditional boundaries between these phases. This overlap is a reflection of the complex nature of disasters in the African context, where communities face a range of socio-economic and environmental vulnerabilities.

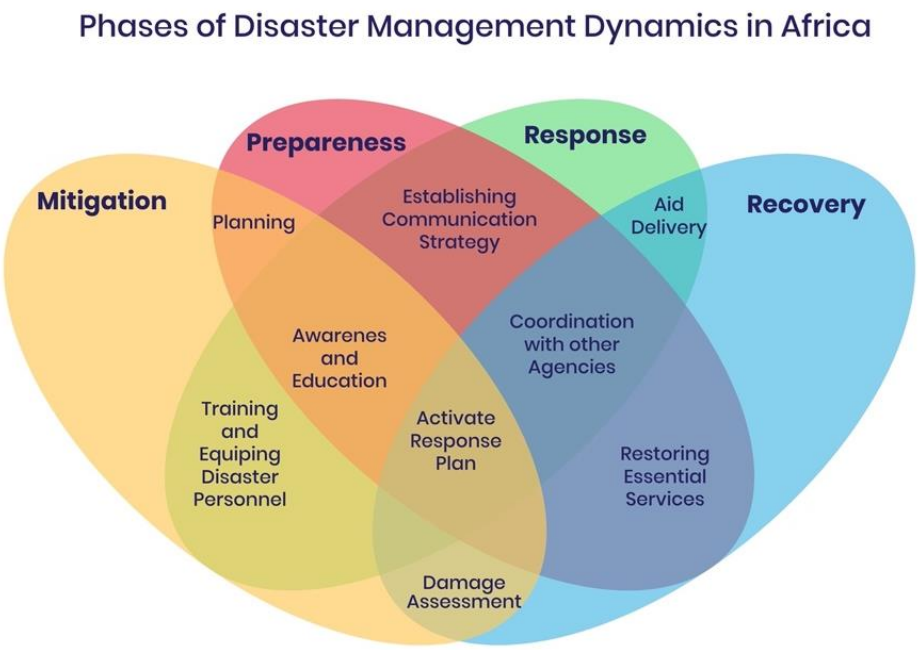

Figure 2.2 Dynamics of Disaster Management in Africa (Researcher's Elaboration)

Furthermore, the role of social media in disaster management communication is particularly significant in the African context. While social media platforms offer rapid and widespread means of communication, they are often heavily relied upon during the response and recovery phases. Real-time information gathering and dissemination through platforms like X (Twitter), Facebook, and WhatsApp becomes instrumental in providing critical updates, coordinating rescue efforts, and facilitating community engagement. The immediacy and accessibility of social media make it a powerful tool, especially when other traditional communication channels may face limitations. However, this concentrated focus on the response phase and the reliance on social media also underscore the need for a more balanced and comprehensive approach to disaster management in the African context. While quick response efforts are essential, the importance of investing in mitigation and preparedness measures to build long-term resilience cannot be ignored. This may involve addressing immediate needs and working towards reducing vulnerabilities and enhancing community capacity to withstand and recover from disasters.

2.5 Disaster Management Approaches

Disasters have the potential to disrupt communities, overwhelm resources, and challenge the resilience of nations. In the face of these complex and unpredictable events, disaster management plans provide a strategic framework to mitigate risks, enhance preparedness, and coordinate effective responses. These approaches, discussed below, involves a combination of

interrelated actions and considerations that collectively guide the efforts of disaster management organizations and various stakeholders.

2.5.1 Risk Assessment

A risk assessment is indispensable for the development of effective emergency and disaster strategies, particularly when integrating social media. This analysis involves understanding the nature of hazards, vulnerabilities, and exposure within a community (Ngamassi, Ramakrishnan & Rahman, 2016). Threats from hazards like floods and COVID-19 necessitate a thorough examination of frequency, magnitude, and potential impact, utilizing both data and scientific models. Simultaneously, assessing vulnerabilities entails scrutinizing the socioeconomic factors, infrastructure conditions, and community demographics that may exacerbate the impact of hazards, with community engagement providing essential local insights. Exposure analysis involves determining the extent to which people, infrastructure, and assets are at risk, considering population density, land use patterns, and critical infrastructure locations. In the modern context, the role of social media cannot be understated; it serves as a dynamic tool for real-time information dissemination, community engagement, and situational awareness (Fauzi, 2023). Social media plays a role in providing timely updates, facilitating communication during emergencies, and aiding in community-based risk assessment (Al-Dmour et al., 2020). However, there is a notable gap in studies regarding the incorporation of social media dynamics into risk assessment. The increasing prevalence and impact of social media on disaster management and community resilience demand more attention. Limited research addresses the potential of social media not only as a tool for information dissemination but also as a source for real-time data collection and community engagement during crises.

2.5.2 Community Engagement

Community engagement is a fundamental principle in effective disaster management, recognizing that communities are not only at the forefront of disaster impact but also invaluable partners in resilience (AIDR, 2020). By involving community members in planning and decision-making, individuals are empowered and a sense of ownership and responsibility is fostered. This active engagement transforms communities into proactive contributors to their own resilience, utilizing their knowledge, traditions, and networks. Moreover, community engagement emphasizes the need for tailored disaster management strategies that reflect the unique needs and dynamics of specific localities, ensuring that responses are not only effective but also culturally sensitive and inclusive.

In recent times, social media has become an essential tool for community engagement. Platforms like Facebook, X (Twitter), and Instagram provide avenues for rapid information dissemination, real-time communication, and community mobilization. Social media serves as a dynamic tool that amplifies the voices of community members, facilitates quick response coordination, and enhances overall disaster resilience (Nayomi, Tan & Ashantha, 2020). However, there is a tendency in the literature to generalize the concept of community engagement without sufficient attention to the unique challenges and opportunities presented by different cultural contexts like Africa. The effectiveness of community engagement strategies may vary significantly across diverse communities, and a more in-depth understanding of these variations is essential for designing tailored and culturally sensitive approaches. Furthermore, while the role of social media in community engagement is acknowledged in recent discussions, there is a lack of comprehensive studies that critically examine the impact, challenges, and ethical considerations associated with utilizing social media platforms in disaster management. A more detailed exploration of the dynamics like this research sought to do, would contribute to a better understanding of the risks and benefits associated with these technologies.

2.5.3 Interagency Coordination

Effective disaster management hinges upon the ability of diverse agencies to collaboratively navigate the web of challenges presented by catastrophic events (Shah, 2022). In this context, a harmonious collaboration among disaster management organizations, government bodies, non-governmental organizations (NGOs), and international entities becomes essential for success. The combination of efforts from various agencies is essential for several reasons. First, it enables the optimal utilization of resources (Shah, 2022). In the aftermath of a disaster, resources are often scarce and in high demand. Through coordination, agencies pool their expertise, manpower, and material assets to ensure that aid is distributed effectively and efficiently. This collaborative approach minimizes duplication of efforts and maximizes the impact of the assistance provided. Moreover, interagency coordination serves to minimize redundancies (Sundnes, 2014). When multiple agencies are involved in disaster response, there is a risk of overlapping initiatives and conflicting strategies. Coordinated efforts help streamline operations, eliminating duplicative tasks and ensuring that each agency contributes in a complementary fashion. This not only conserves resources but also avoids confusion and enhances the overall efficacy of the response. A unified front in response efforts is another critical outcome of effective coordination. Disasters demand swift and decisive action, and a

fragmented response can lead to inefficiencies and delays. Through regular communication and joint planning, agencies can synchronize their activities, share crucial information, and align their objectives (Andreassen, Jarl & Sydnes, 2020). This creates a cohesive and well-coordinated response, presenting a formidable force against the challenges posed by the disaster.

2.5.4 Innovation and Adoption of Technology

Literature on leveraging technology in disaster management generally supports the notion that technological tools, such as Geographic Information Systems (GIS), satellite imagery, drones, and social media platforms, significantly enhance the efficiency and effectiveness of disaster response (Abid et al., 2021; Akpan et al., 2019; Kedia, et al. 2022). These studies highlight the value of real-time data provided by these technologies, allowing for quicker and more informed decision-making during emergencies. GIS, for instance, enables spatial analysis and mapping, aiding in resource allocation and identifying high-risk areas. Satellite imagery and drones offer unparalleled capabilities for damage assessment and situational awareness, facilitating a more targeted and immediate response. Additionally, the integration of social media platforms has proven instrumental in communication, information dissemination, and community engagement, allowing authorities to tap into a broad network of real-time data sources (Dragović et al, 2019; Zhou et al., 2018) while enhancing situational awareness, rapid information sharing, increased community participation, and the ability to reach a large audience quickly, which contribute to more efficient and effective emergency response and recovery efforts (Abdulhamid et al, 2021)

However, the African continent faces unique challenges in fully harnessing the potential of these technologies for crisis mitigation and management (Loeb, 2023). These challenges include limited access to advanced technology, inadequate infrastructure, and socioeconomic factors. There is the need for exploring strategies that consider the specific context and challenges faced by African nations while investigating appropriate innovations that ensure that the benefits of technological advancements are realized across diverse regions and communities.

2.5.5 Capability Building

Capability building is a continuous and indispensable process in disaster management, involving the enhancement of capabilities within both communities and disaster management organizations. This approach involves various strategies, including comprehensive training

programs and the provision of essential resources, all of which collectively contribute to the development of a skilled and resilient workforce (Cvetkovic et al., 2021). Training programs play a pivotal role in equipping individuals with the knowledge and skills necessary for effective disaster response, encompassing aspects such as search and rescue operations, first aid, and coordination of emergency logistics. Moreover, capability building extends beyond the immediate response phase to include long-term recovery and reconstruction efforts, aiming to build sustainable resilience in disaster-prone regions. This involves not only addressing the immediate needs of affected communities but also empowering them with the tools and knowledge to rebuild and recover in a manner that reduces vulnerability to future disasters. The provision of necessary resources, including tangible and intangible ones, is crucial for enabling disaster management organizations to carry out their roles effectively.

An emerging element in capability building is the integration of digital technologies such as social media in disaster management. Digital technologies have demonstrated great promise in strengthening the capabilities of disaster management organizations which serve as powerful tools for communication, information dissemination, and community engagement during disasters and emergencies (Chen, Shirazi & Wang, 2021). While the integration of social media in capability building is acknowledged, more specific examples or case studies demonstrating its effectiveness in real-world scenarios could strengthen the argument. It would be beneficial to explore potential challenges or limitations associated with relying on social media, such as misinformation, digital divides, and data privacy concerns. Additionally, considering the rapidly evolving nature of technology, discussing how disaster management organizations can adapt and stay ahead of emerging trends in social media would be relevant.

2.5.6 Adaptive Management

In the context of capability building in disaster management, the concept of adaptive management emerges as a critical component. Acknowledging the uniqueness of each disaster, adaptive management involves a continuous learning process derived from past experiences, allowing for the flexible adjustment of strategies to better address future challenges (Saroar & Routray, 2015). Regular evaluations, post-disaster reviews, and continuous improvement cycles form the backbone of adaptive management, ensuring that disaster management plans remain dynamic and responsive to the evolving nature of risks (Hutagalung, 2023). Incorporating adaptive management into capability building initiatives involves cultivating a culture of reflection and learning within disaster management organizations. Post-disaster

reviews provide an opportunity to assess the effectiveness of strategies employed, identify areas for improvement, and capture valuable lessons learned. Moreover, the continuous improvement cycles inherent in adaptive management facilitate an iterative process of refining and enhancing disaster management capabilities. This involves updating training programs based on the latest information and technology, incorporating feedback from simulation exercises, and staying abreast of emerging trends in disaster response (Gerrard, 2016).

The role of social media in adaptive management cannot be understated. Social media platforms serve as a dynamic resource, allowing disaster management organizations to gather feedback, assess public sentiment, and adapt communication strategies accordingly. Additionally, social media platforms provide a space for communities to share their experiences, contributing to a collective understanding of the challenges faced during disasters and informing adaptive strategies. The discussion on adaptive management within the context of capability building in disaster management provides a valuable perspective for this research, though it would be beneficial to delve deeper into the specific challenges and obstacles that organizations might face when attempting to implement adaptive management. This research endeavours to fill the knowledge gap by identifying potential barriers and enablers, such as resource constraints and organizational culture and dynamic capabilities which would provide a more realistic understanding of the complexities involved in fostering an adaptive approach.

2.5.7 Collaborations

Collaborations play a key role in disaster management, requiring inter-organizational cooperation. Sharing of resources, expertise, and support during emergency and disaster events underscores the importance of mounting an effective and coordinated response. This collaborative approach is instrumental for information exchange, long-term recovery, and coordinated relief efforts, ultimately reinforcing the resilience of stakeholder organizations (Tabaco et al., 2023).

In the face of disaster, the pooling of resources and expertise among various organizations becomes essential for addressing the multifaceted challenges that arise. Collaborations enable a more efficient allocation of assets, ensuring that response efforts are well-coordinated and tailored to the specific needs of affected communities. Information exchange is also a critical facet of collaborative disaster management (Tabaco et al., 2023). In an era where technology, including social media, facilitates real-time communication, collaborations enable organizations to share crucial information swiftly. Social media platforms serve as tools for

disseminating real-time updates, coordinating efforts, and engaging with affected communities. By harnessing the power of social media, collaborations can foster a more inclusive communication network, enabling stakeholders to stay informed and aligned in their response strategies.

2.6 Disaster Impact and Community Resilience

Emergencies, disasters, and crises have profound impacts on societies especially on both social and economic dimensions. The Accra floods and COVID-19 pandemic for instance led to the disruption of social structures, causing displacement, loss of lives, and damage to community cohesion. In the case of the Accra floods, it unleashed a degree of social and economic disruptions. The flooding of urban areas resulted in physical displacement and shattering of social and economic structures that form the backbone of communities (Atanga & Tankpa, 2022; Yin et al., 2021). Homes were destroyed and the sense of security that comes from a stable living environment was shattered. The loss of lives, a tragic consequence of the floods also created immediate grief and had enduring impacts on the social fabric (Yin et al., 2021). Similarly, the global COVID-19 pandemic thrust societies into unprecedented challenges, manifesting profound social and economic impacts. The virus's rapid spread necessitated stringent public health measures, including lockdowns, social distancing, and widespread quarantine (Aberese-Ako et al., 2022; Ibn-Mohammed et al., 2021). These measures, while crucial for public safety, disrupted daily life on an unprecedented scale. Socially, individuals experienced isolation, a decline in mental well-being, and disruptions to traditional social interactions while economic activities ground to a halt, leading to widespread unemployment, business closures, and financial instability for countless households (Aberese-Ako et al., 2022). In both the Accra floods and the COVID-19 pandemic, the intersection of social and economic dimensions underscores the need for holistic approaches to disaster management and crisis response. Understanding the interconnectedness of these dimensions is essential for developing effective strategies that not only address immediate challenges but also foster long-term resilience within communities. The lessons learned from these experiences, as in the case of the EDMOs in this study, become crucial for shaping policies, building community resilience, and preparing for an uncertain future marked by the inevitability of emergencies and disasters.

Community resilience refers to the ability of a community to withstand, adapt to, and recover from adverse situations, shocks, or disruptions. It involves the collective capacity of community members to anticipate, prepare for, respond to, and bounce back from challenges,

whether they are disasters, economic downturns, social crises, or other unforeseen events (Zaman & Mohammad, 2023). Thus, community resilience emerges as a critical concept in understanding how societies navigate and recover from such crises. The role of social media in disaster management and community resilience is a dynamic aspect of contemporary research and understanding social media's impact on community resilience is essential for harnessing its potential while mitigating its drawbacks (George et al., 2023).

2.7 Chapter Summary

This chapter delved into the interrelationship between disaster, emergency and crisis and why they were used interchangeably in this research. As demonstrated, a disaster is often characterized by a serious disruption that overwhelms a community's capacity to cope with its own resources. Emergencies, on the other hand, are described as unexpected and often dangerous situations requiring immediate action while crises are identified as times of intense difficulty or danger. The interchangeable use of these terms reflects the interconnected nature of events that fall within the purview of disaster management, emergency response, and crisis mitigation. In the face of these unpredictable events, the chapter also highlighted research gaps in existing literature while exploring disaster management approaches which involves a combination of interrelated actions and considerations that collectively guide the efforts of disaster management organizations and various stakeholders.

CHAPTER THREE
EMERGENCY AND DISASTER COMMUNICATION

3.1 Introduction

In the face of emergencies and disasters, effective communication is essential for successful outcomes, playing a key role in mitigating the impact of the events on individuals and communities. The importance of communication during these critical times cannot be overstated, as it serves as the basis for coordinated efforts, rapid response, and the dissemination and gathering of critical information. In this chapter, we will review the aspects of communication in the context of emergencies and disasters. We will explore the aspects of information flow, risk communication, community engagement, and communication capabilities of disaster management organizations.

3.2 Information Flow

The flow of information during emergencies and disasters is a key process that plays a role in shaping public understanding, influencing decision-making, and ultimately determining the effectiveness of disaster response efforts. An examination of the literature on information flow during emergencies and disasters reveals the features of this phenomenon, influenced by various factors such as technology, information flow dynamics and communication channels.

3.2.1 Role of Technology

Technological advancements have ushered in a profound transformation in the landscape of information dissemination, exerting a significant influence on the flow of information during emergencies and disasters. The widespread adoption of mobile devices, the ubiquity of social media platforms, and the availability of real-time communication tools have collectively reshaped how individuals access, process, and share information when confronted with crises (Bukar et al., 2022). The advent of mobile devices has empowered both individuals and disaster management organizations to receive instant updates and alerts directly on their smartphones, enabling them to stay connected and informed during emergencies. These devices serve as portable hubs for disseminating and accessing critical information, ranging from disaster updates to safety guidelines. The portability and accessibility of mobile technology ensure that individuals can remain informed even while on the move, enhancing their ability to make timely and well-informed decisions in the face of uncertainty (Budimir, Bee & Paul, 2021; IRC, 2017). Social media platforms on the other hand play a key role in facilitating the rapid

dissemination of information during crises. Platforms like X (Twitter), Facebook, and Instagram become virtual forums where individuals share real-time updates, eyewitness accounts, and valuable insights. The interactive nature of social media fosters a sense of community and connectivity making the sharing of resources and coordination of relief efforts easier while allowing affected individuals to receive support (Ghosh, 2018). Also, Real-time communication tools, such as messaging apps and emergency alert systems, enhance the efficiency of information dissemination (Eksert et al, 2017).

Analysis of the literature reveals some gaps that warrant consideration. The emphasis on technology seems to overshadow the importance of human-centric approaches to disaster communication (Prasad & Nigam, 2023). During emergencies, interpersonal communication and local knowledge play crucial roles in ensuring that critical information reaches those most in need. Moreover, there appears to be an inadequate attention to information overload and misinformation**.** While technology has facilitated rapid information flow during disasters, it has also contributed to an overwhelming influx of information, making it difficult to distinguish between reliable and unreliable sources (Mwangi, 2023). This can lead to confusion, misinformation, and even panic among affected populations. To bridge these gaps in understanding, this research adopts a qualitative approach to investigate the utilization of social media by the EDMOs. Social media, as a communication tool, is deeply embedded in contemporary society and offers a unique lens through which human-centric approaches can be observed. By delving into the strategies and practices employed by the EDMOs on social media platforms during emergencies, the study aims to uncover insights into the integration of human-centric elements within the broader framework of disaster communication. This approach allows for understanding of the human dynamics involved in disaster communication, shedding light on the ways in which technology and human-centric approaches intersect and influence each other while highlighting how the EDMOs distinguish reliable and unreliable information.

3.2.2 Information Flow Dynamics

The flow of information, as shown in Figure 3.1, is a critical aspect of emergency management and disaster response. Effective communication with the public is essential for ensuring safety, promoting preparedness, and facilitating recovery efforts. The existing literature on this topic suggests that the information flow typically evolves through three distinct phases:

- *Initial Response:* The initial phase of the information flow is characterized by a surge of communication as people endeavour to verify the event, comprehend the severity of the situation, and establish contact with loved ones (Sutton & Pezar, 2015; Lin & Liu, 2018). Social media, instant messaging, and traditional communication channels witness heightened activity as individuals share real-time updates and express concerns.

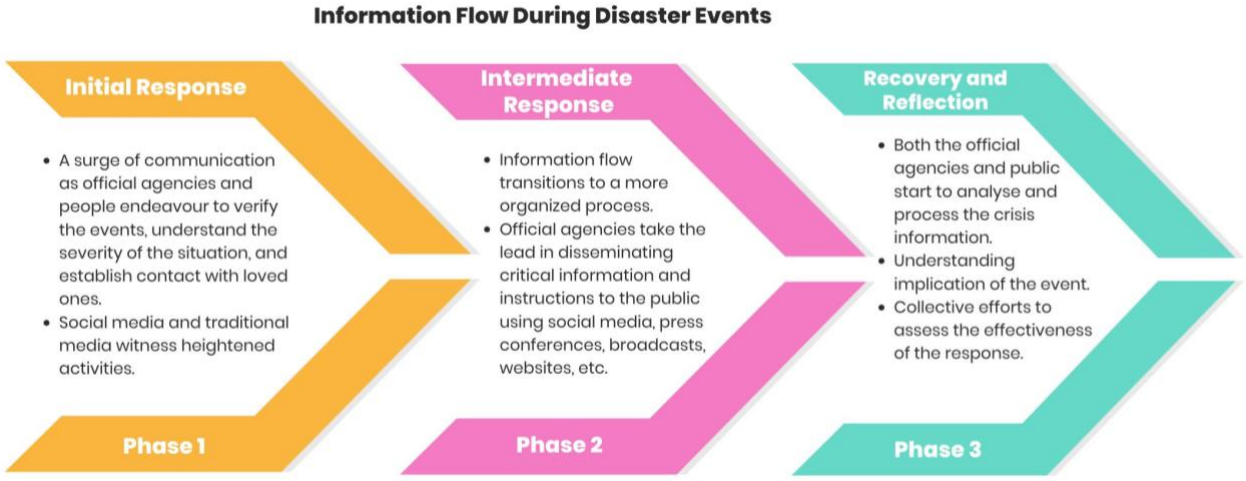

Figure 3.1 Information Flow Dynamics During Disasters (Researcher's Elaboration)

- *Intermediate Response:* As the situation unfolds, the information flow transitions into a more deliberate and organized process. The EDMOs and other official agencies take the lead in disseminating critical updates, guidance, and instructions to the public. This phase is characterized by a more structured communication framework, with authorities leveraging various channels such as social media, press conferences, emergency broadcasts, and dedicated websites to keep the affected population informed (Ahmed & Parker, 2015; Zhang & Ramakrishnan, 2018).
- *Recovery and Reflection:* In the aftermath of the immediate response, the final phase of the information flow emerges, characterized by a period of reflection and analysis. Both the EDMOs and affected communities start to process the crisis information, seeking to understand the broader implications of the event. During this time, there is a collective effort to assess the effectiveness of the response, identify lessons learned, and formulate strategies for future preparedness (Pan & Kim, 2018; Huang & Powers, 2019).

The flow of information stands as a foundation in the effective management and response to emergencies and disasters. Recognizing this is imperative for devising strategies that facilitate optimal communication with the public in times of crisis. The existing literature has undeniably

shed light on various facets of information flow during such events, yet a significant gap exists in the examination of the dynamic capabilities of disaster management organizations. While the importance of information flow is extensively discussed, there is a noticeable lack of emphasis on how disaster management organizations dynamically adapt to evolving circumstances (Sawalha, 2020). Emergency situations are inherently unpredictable and can rapidly change in scale and complexity. This necessitates disaster management organizations to possess not only robust initial response strategies but also the ability to flexibly adjust their approaches as the crisis unfolds. Understanding the dynamic capabilities of disaster management organizations is vital for comprehending the effectiveness and resilience of their communication strategies (Prayag, 2023). This knowledge gap may hinder the development of comprehensive and adaptable frameworks for emergency communication. In this research, the dynamic capabilities of the EDMOs are highlighted and discussed with the potential of contributing to the development of more effective and resilient strategies for communicating with the public during emergencies and disasters.

3.2.3 Communication Channels

The choice of communication channels plays a pivotal role in ensuring that critical information reaches the affected population promptly and accurately. Studies show that emergency and disaster management organizations utilize a diverse range of communication channels to cater to different preferences, accessibility needs, and the evolving nature of emergency situations. Traditional communication channels, such as radio, television, and public announcements, have long been the cornerstone of emergency communication and have been identified in our research as some of the supporting technologies that have been used by the EDMOs. These channels offer several distinct advantages including wide reach. Traditional media outlets possess a broad reach, enabling them to disseminate critical information to a large audience simultaneously (Sutton & Pezar, 2015). Additionally, radio and television are accessible to a broad spectrum of individuals, regardless of their socioeconomic status or technological proficiency (Ahlers & Chowdhury, 2015). Moreover, Traditional media outlets generally enjoy a high level of public trust, enhancing the credibility of information disseminated during emergencies (Lin & Liu, 2018).

However**,** the advent of digital technologies, such as social media, has revolutionized the communication landscape, offering new and innovative channels for emergency information gathering and dissemination (Dragović et al, 2019; Zheng & Mason, 2022). Social media

platforms like X (Twitter), Facebook, and WhatsApp have emerged as powerful tools for real-time information sharing during emergencies (Abdulhamid et al; Zheng & Mason, 2022) and are seen as the first choice for information dissemination (Cai, 2022). Nonetheless, research on social media communication is largely focused on the one-way communication aspect., characterized by the dissemination of information from authorities to the public without insights on how they gather feedback or interact with the public, overlooking the crucial aspect of a dialogue between stakeholders. The dynamic nature of emergencies often requires a more interactive and participatory communication approach, where information exchange is not only top-down but also incorporates feedback from the affected population (Nkombi & Wentink, 2022). This limitation in the existing research hampers a comprehensive understanding of the complexities inherent in effective emergency communication. Two-way communication is essential for gauging the needs, concerns, and insights of the affected community, fostering a sense of agency and empowerment among individuals during crises (Anson, Petersen & Watson, 2018; Nina et al., 2023). In this research both the information gathering and dissemination strategies of the EDMOs have been studied and highlighted, emphasizing the two-way communication functionality of social media.

3.3 Disaster Risk Communication

Emergencies, characterized by their unpredictable and often chaotic nature, inherently carry a significant degree of uncertainty and risk. In such challenging circumstances, effective risk communication emerges as a critical component necessary in the efforts to minimize adverse outcomes and facilitates informed decision-making and public safety (WHO, 2017). During emergencies and disasters, the uncertainty surrounding the situations gives rise to incomplete information which contributes to anxiety and confusion among the affected population. In these instances, clear and transparent risk communication becomes important for reassurance. Providing regular updates, acknowledging uncertainties, and explaining the evolving nature of the emergency can help establish trust between authorities and the public (Fornalev, Armiero & Odasso, 2023). Moreover, effective risk communication serves as a conduit for disseminating vital information. This includes guidance on protective measures, evacuation procedures, and updates on the status of the emergency (Hanson-Easey et al., 2018). Timely and accurate information empowers individuals to make informed decisions about their safety and well-being. It is not just about providing data but translating complex information into accessible formats, ensuring that it reaches diverse audiences with varying levels of literacy and comprehension (Meesters, 2021). In times of crisis, public perception and behaviour can

have a profound impact on the overall outcome. Misinformation and rumours can spread rapidly, contributing to panic and impeding effective response efforts. Risk communication acts as a potent tool for dispelling rumours, correcting misinformation, and reinforcing a unified understanding of the situation (Malik, Khan & Quan-Haase, 2021). By fostering a sense of community and shared responsibility, it helps create a more resilient and cooperative response from the public. Furthermore, risk communication plays a crucial role in managing the expectations of the affected population. Clearly outlining the potential risks and uncertainties, while also highlighting the measures being taken to address the situation, helps manage expectations and reduce unrealistic fears (WHO, 2017; Varghese et al., 2021).

The significance of effective risk communication during emergencies cannot be overstated. It is a process that goes beyond the mere transmission of information to building trust, empowering individuals with knowledge, dispelling misinformation, and fostering a collective understanding of the situation. Risk communication is an invaluable tool for navigating the uncertainties inherent in crises and ultimately safeguarding the well-being of communities. The existing research primarily focuses on the general importance of risk communication during emergencies. However, there is a need for more research that delves into contextual variations in how risk communication is received and acted upon (Sten et al., 2020) such as the Accra flood and COVID-19 as explored in this research, understanding how different contexts influence the effectiveness of communication. Thus, providing concrete examples or case studies could enhance the practical understanding of these concepts. Real-world studies would make the information more relatable and applicable to readers. Again, with the rapid advancement of communication technologies, there is a gap in understanding how emerging digital tools, such as social media, can be effectively integrated into risk communication strategies (Nic et al., 2022). In this research, we explore the opportunities and challenges posed by these technologies in disseminating timely and accurate information during emergencies. Addressing these research gaps would not only advance the theoretical understanding of risk communication in emergencies but also offer practical insights for policymakers, emergency responders, and communication professionals working in disaster management.

3.4 Community Engagement

Community engagement in the context of emergency and disaster communication goes beyond a mere involvement; it represents a relationship between disaster management organizations and the communities they serve. This process involves a range of strategies and activities

designed to disseminate information, listen, understand, and respond to the needs and concerns of affected communities during crisis. Saum-Manning (2021) opines that community engagement seeks to establish a foundation of trust between emergency responders and the public which is crucial during times of crisis, as it facilitates effective communication, cooperation, and adherence to safety guidelines. Building this trust requires consistent and transparent communication that keeps communities informed about potential risks, available resources, and the actions being taken to address emergencies (Fornalev, Armiero & Odasso, 2023).

Fostering collaboration is another key element of community engagement (Nadia et al., 2016). By involving community members in the planning and decision-making processes related to disaster preparedness, response, and recovery, disaster responders can tap into local knowledge and social networks. This collaboration not only enhances the effectiveness of emergency initiatives but also empowers communities to actively contribute to their own resilience (Myers, 2021; Sachit et al., 2022). Another aspect of community engagement is empowerment which involves providing communities with the knowledge, skills, and resources they need to play an active role in their safety and well-being (Pandey, 2019). This empowerment goes beyond just providing information to include training programs, community drills, and the creation of support networks that enable individuals and groups to respond effectively to emergencies (Haldane et al., 2019).

Community engagement is a key component of emergency and disaster communication, encompassing the strategies and processes employed to involve communities in disaster preparedness, response, and recovery efforts. One of the primary functions of community engagement is to bolster disaster preparedness. It achieves this by acting as a conduit for the seamless flow of information regarding risks and vulnerabilities within the community (Nkombi & Wentink, 2022). By actively involving community members, authorities can identify and address specific vulnerabilities, ensuring that preparedness plans are not generic but are instead finely tuned to meet the unique needs and contextual intricacies of the community. Aguilar-Gaxiola et al. (2022) supports this notion and states that community engagement serves as a linchpin for the dissemination of tailored preparedness plans. These plans, crafted with the active participation of community members, become more effective tools for mitigating risks and managing crises, aligning seamlessly with the community's distinct needs.

In emergency and disaster response, community engagement operates as a catalyst for timely and accurate information sharing (Hope et al. 2021). Through this process, communities gain the knowledge required to take early protective actions and respond with efficacy to unfolding emergencies. This proactive approach is invaluable in minimizing the impact of disasters and saving lives. Ultimately, community engagement fosters a resilient culture by instilling a sense of ownership within individuals and communities during disasters.

Identifying and engaging diverse stakeholders is necessary for effective emergency and disaster communication, acknowledging their roles in building resilience within communities. However, within the existing literature, despite widespread recognition of their importance and providing insights for this research, significant gaps persist in understanding the practical implementation of engagement strategies, the efficacy of feedback mechanisms, and the collaborative capabilities of disaster management organizations with their stakeholders (Maureen, Barbara & Kim, 2020; Pang, Zhang & Zhang, 2022; Abdeen et al., 2021). These gaps constitute critical areas of inquiry, particularly in the context of increasing the capabilities of disaster management organizations, a focus highlighted in our research. While the literature acknowledges the importance of engaging diverse stakeholders, there remains a notable gap on how disaster management organizations actually implement these strategies in real-world scenarios. Existing studies might touch upon the theoretical foundations or advocate for the necessity of inclusivity, but practical insights into the challenges, successes, and failures in execution are often lacking (Maureen, Barbara & Kim, 2020). This research aims to bridge this gap by investigating and documenting the practical experiences of disaster management organizations in implementing stakeholder engagement strategies. Collaboration is the bedrock of effective disaster management, yet existing literature often provides only a cursory glance at the collaborative capabilities of disaster management organizations with diverse stakeholders. This gap leaves room for questions about the nature and depth of partnerships, the inclusivity of decision-making processes, and the sustained engagement with stakeholders beyond the immediate aftermath of disasters. In this research, we delve into the collaborative dynamics between disaster management organizations and stakeholders, scrutinizing the factors that facilitate effective collaboration aiming to provide insights that can strengthen the collaborative capabilities of these organizations, fostering more resilient and interconnected communities.

3.5 Communication Capabilities of Disaster Management Organizations

Social media has emerged as a powerful tool for disaster management organizations, providing a wealth of resources to enhance their capabilities in responding to and managing crises effectively (Smith, 2020). Leveraging the far-reaching and real-time nature of social media platforms like X (Twitter) and Facebook, these organizations can seamlessly connect with the public, coordinate response efforts, and disseminate critical information during emergencies (Jones, 2019). This unprecedented level of communication has revolutionized disaster management, enabling the organizations to respond with greater agility and precision. At the heart of this transformation lies the utilization of tangible social media resources, the physical assets that underpin effective communication during emergencies and disasters. These resources encompass a range of hardware and software tools, including computers, smartphones, internet connectivity, and specialized software applications (Jones, 2019). The availability and optimal functioning of these resources are paramount for ensuring seamless communication and information sharing during critical moments.

Computers serve as the backbone of social media engagement, providing the processing power necessary to manage and disseminate information effectively (Afzal et al., 2022). During disasters, computers enable disaster management organizations to rapidly update social media feeds with critical information, such as warnings, evacuation instructions, and real-time updates on response efforts. In recent times, smartphones have become indispensable tools for disaster management, bridging the gap between disaster management organizations and the public in real time (Sechi, Hendriks & Pregnolato, 2023). Equipped with social media applications, smartphones enable disaster management personnel to monitor social media feeds, gather real-time information, and address public concerns promptly (Sechi, Hendriks & Pregnolato, 2023). Reliable internet connectivity is the lifeline of social media communication, enabling the seamless transmission of information during emergencies. Without a stable internet connection, the ability of disaster management organizations to disseminate critical updates and engage with the public via social media channels is severely hampered (Afzal et al., 2022). Thus, the effective utilization of tangible social media resources has had a profound impact on disaster management practices. By facilitating real-time communication and information sharing, these resources have led to enhanced public awareness and improved response coordination.

While current research has brought attention to the transformative impact of integrating tangible social media resources into disaster management strategies, there is a notable gap in understanding the role of intangible resources and the dynamic capabilities of disaster management organizations in shaping their disaster communication strategies. Intangible resources encompass the intangible assets that organizations possess, such as knowledge, expertise, and relationships (Eisenhardt & Martin, 2000b). In the context of disaster management, the knowledge base of organizations, accumulated through experience and training, plays a pivotal role in shaping effective communication strategies. The expertise of personnel in interpreting and disseminating information during crises contributes significantly to the overall success of communication efforts (Sanjeev et al., 2021). The dynamic capabilities of disaster management organizations, referring to their ability to adapt, learn, and innovate in the face of evolving challenges (Teece, Pisano, & Shuen, 1997), are also crucial in shaping communication strategies. Organizations with strong dynamic capabilities can swiftly adjust their communication approaches based on the nature of the disaster, the characteristics of the affected population, and the available resources (Paavola, 2021). This adaptability ensures that communication strategies remain responsive and relevant in the rapidly changing landscape of disaster situations. Understanding how intangible resources and dynamic capabilities influence disaster communication strategies is imperative for improving the overall effectiveness of disaster management. Organizations with a robust knowledge base can more effectively interpret and contextualize information, ensuring that messages are accurate, clear, and tailored to the specific needs of diverse communities (Asiamah, 2023). Moreover, dynamic capabilities enable organizations to navigate uncertainties, incorporate lessons learned from past incidents, and implement innovative communication approaches that resonate with the evolving dynamics of crises (Teece, Pisanoc & Shuen, 1997).

In this research, we explore how both tangible and intangible resources of disaster management organizations influence decision-making in communication strategies during crises. Additionally, we examine how these organizations used their dynamic capabilities to leverage social media platforms to adapt their communication processes providing valuable insights into optimizing disaster response efforts. Therefore, we argue that while tangible social media resources play a crucial role in disaster communication, recognizing the significance of intangible resources and dynamic capabilities is essential for a comprehensive understanding of how disaster management organizations navigate the landscape of crisis communication. This holistic perspective can inform strategies that capitalize on the collective knowledge,

expertise, and adaptability of organizations, ultimately enhancing their ability to communicate effectively and respond resiliently to a wide range of disasters.

3.6 Summary of Chapter

The chapter explored communication within the context of emergencies and disasters, delving into aspects such as the role of technology in disaster communication, information flow, risk communication, community engagement, and the communication capabilities of disaster management organizations. Firstly, insights were given into the importance of technology in modern disaster communication and the dynamics of information flow during emergencies. With support from literature, we argue that the rapid dissemination of accurate and timely information is critical for effective crisis management while unravelling how information moves during disasters between disaster management organizations and the public. Recognizing the patterns in information flow enables a more nuanced comprehension of how individuals, communities, and organizations process and respond to critical information in times of crisis.

Risk communication has also been a focal point of the review. Effectively conveying the magnitude and potential impacts of a disaster to the public is essential for fostering preparedness and minimizing harm. We have explored the strategies employed by disaster management organizations to articulate risks in a manner that is accessible, comprehensible, and actionable for the public. Community engagement emerged as another critical component in our review. Recognizing that disasters affect communities in unique ways, our focus has been on understanding how disaster management organizations engage with and involve communities in the communication process. Moreover, the review extended to the communication capabilities of disaster management organizations themselves. This includes an analysis of the tools, technologies, and resources that the organizations deploy to facilitate effective communication. The integration of tangible resources such as social media platforms, smartphones, and computers has been analysed while highlighting under-researched areas in the existing literature and stating the need for further research on the intangible resources and dynamic capabilities of disaster management organizations.

CHAPTER FOUR
THEORETICAL FRAMEWORK

4.1 Introduction

This chapter reviews the theories underpinning this research. We delve into the STREMII model, Resource-Based Theory (RBT), and Dynamic Capability View (DCV) as the theoretical framework guiding this study. The utilization of social media in the context of disaster communication involves processes, resources, and capabilities. Consequently, these three theories were considered ideal for comprehending the phenomena. Sections 4.2 to 4.4 elaborate on the fundamental concepts inherent in these theories while section 4.5 explores the application of these theories in the field of information systems. Aligning with the philosophical foundations of the study (elaborated further in Chapter 5), section 4.6 briefly illustrates how the chosen interpretivist paradigm and the theories support one another. In section 4.7, the rationale for selecting these theories over other theories is justified. Section 4.8 underscores certain limitations associated with the theories. The chapter concludes with a summary in Section 4.9.

4.2 STREMII Model Concepts

The STREMII model, conceived by Stewart and Wilson (2016), stands as a valuable framework designed to navigate crisis communication on social media, particularly disasters. This model serves as a strategic guide for organizations aiming to communicate effectively with their stakeholders when confronted with crisis situations. At its core, the STREMII model draws inspiration from the foundational principles of the Situational Crisis Communication Theory (SCCT). This established theory provides a theoretical foundation, allowing the STREMII model to offer a systematic and step-by-step approach (Stewart & Wilson, 2015). The STREMII model addresses the unique challenges posed by crisis communication on social media platforms. It recognizes the dynamic nature of these environments, where information can spread rapidly and widely, impacting perceptions and responses. By incorporating its elements, the STREMII model guides organizations in crafting and disseminating messages that are not only timely and relevant but also resonate with the emotions of their audience (Young & Stewart, 2018). This framework underscores the importance of active engagement with stakeholders, acknowledging the pivotal role of two-way communication in crisis situations.

4.2.1 The Six Phases of the STREMII Model

The STREMII model consists of six interconnected phases for managing crisis communication on social media:

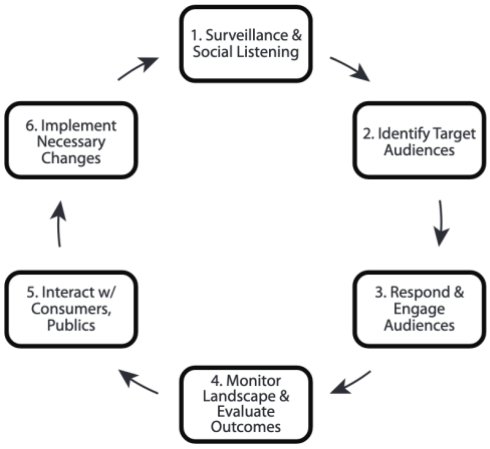

Figure 4.1 The STREMII model of social media crisis communication (Stewart & Wilson, 2016)

1. *Surveillance and Social Listening:* This first phase entails continuously monitoring social media conversations to identify potential crisis situations, understand public sentiment, and gather information about the crisis.
2. *Identify Target Audiences:* The second phase involves clearly defining the target audiences during a crisis, considering their demographics, interests, and concerns. This will help tailor communication strategies to resonate with the specific needs of each audience.
3. *Respond and Engage Audiences:* This phase entails responding to crisis-related discussions promptly. This involves providing accurate information, addressing concerns, and demonstrating care for those affected by the crisis.
4. *Monitor Landscape and Evaluate Outcomes:* This phase implies continuously monitoring the impact of the communication efforts and evaluating their effectiveness which will help in identifying areas for improvement and adapt strategies as needed.
5. *Interact with Consumers and Public:* Here, organizations are required to actively engage with their stakeholders on social media, respond to comments, answer questions, and address concerns. This fosters open dialogue and builds trust with the public.
6. *Implement Necessary Changes:* The last phase demands organizations to learn from the crisis and implement changes to their social media communication strategies and crisis management plans helping them to better prepare for future crises.

4.2.2 Strengths of the STREMII Model

The STREMII model boasts a range of strengths that position it as an effective tool for crisis communication on social media. Firstly, its comprehensiveness is a standout feature, as it covers every facet of the crisis communication process (Stewart & Wilson, 2015). From the initial phase of social listening to the final step of implementing necessary changes, the model ensures a holistic approach, leaving no critical aspect unaddressed. This thorough coverage contributes to the model's ability to guide organizations through the entire crisis management lifecycle (Jin, Ling & Kim, 2021). The model's adaptability is a further advantage, allowing it to be customized to suit various types of crises and diverse organizational contexts (Stewart & Wilson, 2015). This adaptability ensures that the model remains relevant and effective in the face of different challenges, accommodating the unique dynamics of each crisis scenario. Importantly, the STREMII model is rooted in evidence-based practices, drawing on the Situational Crisis Communication Theory (SCCT). This foundation in established theory enhances the model's credibility and reliability. By aligning with well-established frameworks, the STREMII model reflects a deep understanding of the psychological and communicative dimensions of crisis situations (Jin, Ling & Kim, 2021; Stewart & Wilson, 2015). This evidence-based approach not only reinforces the model's theoretical robustness but also provides organizations with a scientifically grounded foundation for their crisis communication strategies.

4.2.3 Limitations of the STREMII Model

While the STREMII model exhibits notable strengths, it is essential to recognize its limitations, which can impact its applicability and effectiveness in certain contexts. Firstly, the model faces a theoretical limitation as it has primarily been tested in pedagogical settings (Stewart & Wilson, 2015; Broom & Smith, 2015). Although it provides a robust theoretical framework, further empirical research is needed to validate its effectiveness in real-world crisis communication scenarios (Jin, Ling & Kim, 2021). This theoretical nature may introduce uncertainties about its practical application, emphasizing the importance of additional empirical validation (Broom & Smith, 2015). Another significant limitation lies in the potential resource intensity associated with implementing the STREMII model (Stewart & Wilson, 2015). The process may demand substantial resources, including dedicated staff time and expertise in crisis communication. This resource requirement could pose challenges for organizations with limited personnel or financial constraints, potentially hindering the model's widespread adoption. Furthermore, the STREMII model is not a one-size-fits-all solution. Its

effectiveness may vary based on the unique needs, circumstances, and characteristics of each organization and crisis situation (Jin, Ling & Kim, 2021). Organizations may find it necessary to adapt the model to align with their specific communication goals, organizational culture, and the nature of the crisis they are facing. This adaptability requirement underscores the importance of a flexible approach to ensure the model's relevance and applicability across diverse contexts.

4.3 RBT Theory Concepts

The Resource-Based Theory (RBT) focuses on the role of an organization's internal resources in achieving sustained competitive advantage. The seminal work by Barney (1991), titled "*Firm Resources and Sustained Competitive Advantage*," is often considered the foundation of the RBT. It contends that an organization's unique and valuable resources are the primary drivers of its performance and success in the marketplace. Derived from the Resource-Based View (RBV), it is one of the most widely used strategic management framework (Kozlenkova, Samaha & Palmatier, 2014; Marchand, Hennig-Thurau & Flemming, 2021). The RBT places an emphasis on the internal resources that organizations command, which are key for executing specific actions and cultivating enduring competitive advantages. These resources encompass a broad spectrum, as elucidated by Barney (1991), ranging from tangible assets to intangible elements such as capabilities, organizational processes, firm attributes, information, and knowledge. These elements collectively empower the organization to conceive and implement strategies that enhance its efficiency and effectiveness in the competitive landscape. Barney's seminal work outlines that resources must not merely exist within the organizational framework; they must possess strategic relevance and contribute substantively to the organisation's capacity to gain a competitive edge. The very essence of these resources lies in their ability to meet the VRIN criteria—being Valuable, Rare, Inimitable, and Non-substitutable (Barney, 1991). Resources meeting these criteria become pivotal in shaping a firm's strategic position, acting as sources of sustained competitive advantage.

Contrary to other perspectives that underscore the influence of external factors such as industry or market position, the RBT contends that it is the internal resources and capabilities of an organization that predominantly dictate its performance trajectory (Barney, 1991). This perspective is a departure from traditional industry-based views of competition and heralds a shift in focus towards the strategic significance of a firm's unique resource endowments. In the context of this research, the application of RBT posits a direct linkage between the social media

performance of the EDMOs and their social media resources. By framing the study through the lens of RBT, the research asserts that the ability of the EDMOs to excel in the social media domain hinges on the strategic deployment and effectiveness of their internal social media resources. Thus, the RBT not only underscores the importance of internal resources but also provided a theoretical framework through which to understand and evaluate the strategic implications of these resources as used by the EDMOs.

The RBT introduces three fundamental constructs essential for understanding how organizations can attain and sustain a competitive advantage: *tangible resources*, *intangible resources*, and *capabilities* (Barney, 1991; Wernerfelt, 1984; Grant, 1991). Tangible resources are the physical assets essential for production, including buildings, machinery, and raw materials like wood or metal (Barney,1991). This tangible dimension is crucial for an organization's day-to-day operations and contributes significantly to its competitive position. In the realm of intangible resources, as noted by Grant (1991), these are assets that are challenging to touch or quantify but play a pivotal role in shaping an organisation's competitive advantage. These include human resources, organizational resources such as culture and reputation, and information resources like databases and intellectual property. The significance of capabilities lies in an organization's ability to effectively deploy and utilize its resources. Capabilities include a spectrum of skills, knowledge, systems, and processes, forming the dynamic core that enables a firm to coordinate and integrate its resources for optimal outcomes (Wernerfelt, 1984).

4.3.1 Strengths of the RBT Theory

The RBT stands out as a prominent theory in strategic management by placing a strong emphasis on internal organizational factors, specifically valuable, rare, inimitable, and non-substitutable (VRIN) resources, as the key drivers of competitive advantage (Barney, 1991). This internal focus distinguishes RBT from traditional external-based theories, which emphasize industry structure and market conditions (Porter, 1980). Instead, RBT suggests that organizations can create and sustain their competitive edge by building unique and valuable resource endowments (Barney, 1991). The VRIN framework highlights that valuable resources contribute to customer value and efficiency, rare resources are difficult for competitors to replicate, inimitable resources are hard to imitate due to complexity or path dependency, and non-substitutable resources lack close alternatives (Barney, 1991). RBT has evolved to encompass the dynamic capabilities perspective, which emphasizes the ability of firms to adapt

and reconfigure their resources and capabilities to meet changing market conditions (Teece et al., 1997). This dynamic perspective recognizes the role of organizational processes and routines in effectively managing and leveraging resources (Eisenhardt & Martin, 2000b). RBT's application across different industries and contexts further demonstrates its versatility and relevance in explaining competitive advantage (Hitt et al., 2005). Moreover, RBT has been integrated with other prominent theories, such as industry analysis and organizational management, to provide a more holistic understanding of competitive advantage (Barney et al., 2001). Finally, RBT has received empirical support through various research studies, suggesting its predictive validity in explaining organizational performance (Peteraf, 1993).

4.3.2 Limitations of the RBT Theory

While the RBT has earned widespread acceptance and influence in the field of strategic management, it is not without criticism, particularly in its capacity to adequately address intangible resources. Traditionally centred on tangible assets, RBT has encountered challenges in fully incorporating the growing significance of intangible resources, such as human capital and intellectual assets, which have become increasingly crucial sources of competitive advantage in the modern business landscape (Teece, 2007b). As industries evolve and knowledge-based economies proliferate, the ability of organizations to leverage intangible resources, such as the skills and expertise of their personnel, becomes pivotal for sustained success. RBT's foundational framework may need adaptation to encompass a comprehensive perspective that not only acknowledges the value of intangible resources but also provides a robust analytical framework for their identification, assessment, and strategic utilization within the competitive landscape. Embracing the dynamic nature of intangible resources is essential for ensuring the continued relevance and applicability of RBT in an ever-changing business environment. The findings of this research shed light on the critical role of intangible organizational resources, particularly in the context of social media, and underscore their potential to enhance the RBT theory. In the contemporary times, where the digital realm significantly influences organizational dynamics, the study reveals that intangible asset, such as adaptive learning and training culture, expert knowledge, and collaborative networks fostered through social media interactions, are instrumental in shaping and sustaining organizational functions. The dynamic nature of social media platforms, with their ability to facilitate rapid information exchange and relationship-building, amplifies the importance of intangible resources. These resources contribute to the organization's ability to harness social media effectively, creating a unique and valuable web presence. As a result, the RBT,

traditionally rooted in tangible assets, is encouraged to adapt its framework to include the strategic significance of intangible resources derived from social media engagement. Recognizing and leveraging these intangible assets becomes pivotal for organizations seeking to optimize their management and fortify their strategic positions in the digital age.

4.4 DCV Theory Concepts

Similar to the RBT, the Dynamic Capability View (DCV) theory extends the focus on organizational resources and capabilities, emphasizing the need for adaptability and responsiveness to changing environments. While RBT underscores the significance of possessing unique and valuable resources, DCV recognizes that the static possession of these resources may not be adequate for sustained competitive advantage. Instead, DCV asserts that dynamic adjustments and strategic deployment of resources are essential for long-term success. The DCV theory, as articulated by Teece (2007a), identifies three fundamental processes: *sensing*, *seizing*, and *transforming*. *Sensing* involves the continuous monitoring and recognition of changes in the external environment, encompassing shifts in technology, market trends, and public preferences. This proactive awareness allows organizations to stay ahead of the curve and anticipate emerging opportunities and threats. Once changes are sensed, the *seizing* process comes into play. This involves the swift and effective mobilization of resources and capabilities to capture identified opportunities. Strategic decision-making, resource allocation, and timely implementation of actions are critical components of the seizing process. Organizations must be agile and responsive, ensuring that they can exploit emerging opportunities before competitors. The *transforming* process is the third key element of dynamic capabilities. This process pertains to an organization's ability to modify, reconfigure, or develop new resources and capabilities in response to changing conditions. It involves activities such as organizational learning, knowledge creation, innovation, and the development of new competencies. The transforming process enables organizations to evolve and adapt their resource base, ensuring that it remains aligned with evolving external dynamics. By integrating these three processes—*sensing, seizing*, and *transforming*—organizations can navigate the complexities of the business landscape effectively. Continuous adaptation and renewal of the resource base enable organizations to enhance their overall performance and maintain a sustainable competitive advantage over time. Teece's (2007a) DCV theory thus complements the RBT by providing a dynamic perspective on how firms can leverage their resources for long-term success in dynamic and unpredictable environments.

4.4.1 Strengths of the DCV Theory

The DCV theory offers several strengths that contribute to its significance in understanding and explaining how organizations can achieve and sustain a competitive advantage in dynamic and changing environments. One of the primary strengths of the DCV theory is its emphasis on adaptability and flexibility. It recognizes that the business environment is dynamic, and organizations need to be able to adapt to changes effectively. This focus on adaptability aligns well with the fast-paced and unpredictable nature of many industries today (Teece, Pisano, & Shuen, 1997). The DCV theory goes beyond the static possession of resources and highlights the importance of strategic renewal. It emphasizes that organizations should not only have valuable resources but also continuously renew and reconfigure them in response to environmental changes. This strategic renewal process enables organizations to stay relevant and competitive over time (Zollo & Singh, 2004). The three key processes of *sensing*, *seizing*, and *transforming* provide a holistic framework for understanding how organizations can navigate change. This approach allows organizations to systematically address different aspects of their operations, from environmental scanning to strategic decision-making and capability development (Helfat & Martin, 2003). The DCV theory's principles are applicable across various industries and organizational contexts. Whether in technology, manufacturing, or services, the theory provides a framework that can be adapted to different situations, making it a versatile tool for understanding and managing dynamic capabilities (Eisenhardt & Martin, 2000a).

4.4.2 Limitations of the DCV Theory

The DCV theory, while robust in its framework for navigating dynamic environments, faces significant critiques regarding its context sensitivity (Helfat & Martin, 2013; Zollo & Winter, 2002). The effectiveness of dynamic capabilities, as outlined by the DCV theory, appears intricately tied to an organization's unique structural, cultural, and operational nuances and what proves successful for one entity may not translate seamlessly to another with distinct characteristics (Priem & Butler, 2001). This critique highlights the need for deeper discussions within the DCV framework, acknowledging and addressing the complexities of different organizational landscapes (Whitley, 2001). Structural variations, encompassing size, hierarchy, and internal processes, can significantly impact how dynamic capabilities are developed and leveraged (Ambrosini & Bowman, 2009). Additionally, cultural disparities among organizations, including leadership styles, risk tolerance, and innovation cultures, may influence how dynamic capabilities manifest (Teece, Pisano, & Shuen, 1997). Operational

details, including industry-specific challenges and regulatory environments, further contribute to the variability in the application of the DCV theory (Barney, 1991). A one-size-fits-all approach simply may not suffice when organizations operate in vastly different sectors, each with its unique demands and constraints (Eisenhardt & Martin, 2000a).

Therefore, the theory would benefit from a more contextualized approach, offering guidelines that can be adapted to suit the specific characteristics of diverse industries and organizational settings. This could involve:

- *Developing context-specific measures of dynamic capabilities:* Moving beyond generic metrics and tailoring them to capture the nuances of different organizational contexts (Barreto, 2014).
- *Investigating the interplay between internal capabilities and external dynamics:* Understanding how industry dynamics, institutional frameworks, and other external factors influence the effectiveness of dynamic capabilities (Whitley, 2001).
- *Exploring the micro foundations of dynamic capabilities:* Studying micro foundations like organizational routines contribute to the development and enactment of dynamic capabilities (Ambrosini & Bowman, 2009).
- *Building bridges between DCV and other relevant frameworks:* Integrating insights from the RBT to create a more comprehensive understanding of competitive advantage in dynamic environments (Zollo & Singh, 2004).

This research tackles some of these challenges by acknowledging the complexities of diverse organizational landscapes and proposing context-specific approaches. By exploring how communication dynamics of emergencies and disasters on social media and their operational details influence the manifestation of dynamic capabilities, this research paves the way for a more impactful DCV theory, ensuring its relevance across diverse contexts and maximizing its potential to guide organizations of all shapes and sizes through the complexities of the modern digital world.

4.5 Applications of STREMII Model, RBT Theory and DCV Theory

The utilization of the STREMII model, RBT, and DCV theories has been somewhat constrained in the past. However, a noticeable shift has occurred in recent times, particularly within the realm of information systems (IS) research, where there has been a growing acknowledgment of their significance. This recognition has sparked a surge in studies showcasing the practical value of these theories in the domain of IS and related areas. This

section embarks on an exploration of the application of these theories in existing IS research and sheds light on how they were specifically employed in the context of this study.

4.5.1 Applications in Information Systems Research

The STREMII Model, designed to encapsulate the key components of strategic emergency and disaster management in the social media age, has increasingly found favour among IS researchers. Its relevance lies in its ability to integrate strategic and technological factors offering a framework for analysing social media information systems. In the landscape of IS research, studies have begun to leverage the STREMII Model to dissect and understand strategic decision-making and technological adaptation within organizations (Smith, 2020). Similarly, the RBT, which traditionally has its roots in strategic management, has gradually permeated the IS research domain (Wade & Hulland, 2004). This theory, emphasizing the role of firm-specific resources in gaining a competitive advantage, has proven instrumental in examining how organizations leverage their unique resources, including information technologies, to achieve superior performance (Barney, 1991). The application of the RBT in IS research has shed light on the strategic deployment of IT resources and their impact on organizational outcomes (Mata, Fuerst & Barney, 1995). The DCV theory on the other hand, with its focus on organizational adaptability and the dynamic reconfiguration of resources, has gained prominence in understanding how organizations cope with the evolving digital landscape (Teece, Pisano & Shuen, 1997). Information systems researchers have increasingly turned to the DCV framework to explore how firms sense, seize, and transform their capabilities in response to technological changes, thereby enhancing their resilience and competitiveness. Based on our literature review, Table 4.1 presents a summary of the theories in IS-related studies.

Table 4.1 A Review of the use of STREMII Model, RBT and DCV Theories in IS-related research.

Theory	Author (Year)	IS Domain	Use of the Theory
STREMII Model	Stewart & Young (2018)	IS/Social Media	Social media crisis communication
	Young, Simmons & Stewart (2019)	IS/Social Media	Social media crisis communication
	Bukar et al. (2020)	Strategic IS	Crisis Informatics
	Hagen et al. (2018)	Strategic IS	Social media crisis communication
	Hagen et al. (2020)	Strategic IS	Social media emergency communication
	Stewart & Wilson (2016)	IS/Social Media	Disaster communication
	Bukar (2020)	General	Crisis Informatics
RBT Theory	Seddon (2014)	IS	Strategic IS research
	Setia & Patel (2013)	IS	Information systems capacities
	Bharadwaj (2000)	IS	Firm performance

	Barney (1991)	IS	Strategic management
	Kipyegon, Obura & Oginda (2018)	IT	Applications development
	Teece et al. (1997)	IS	Strategic management
	Ward & Peppard (2002)	General	Strategic management
	Luftman (2000)	IS	Corporate competence
	Melville et al. (2004)	IS	Firm performance
	DeLone & McLean (1992)	General	IS success
	Zhu et al. (2004)	IS	Organizational agility
	Bharadwaj (2000)	IS	E-business
DCV Theory	Teece (2007a)	General	Strategic technology management, innovation and growth
	Helfat et al. (2007)	IS	Innovation management
	Bharadwaj et al. (1999)	IS	E-business
	Eisenhardt & Martin (2000b)	General	Strategic management
	Zollo & Winter (2002)	General	Knowledge management
	Teece, Pisano & Shuen (1997)	General	Strategic Management
	Eisenhardt & Martin (2000b)	General	Organizational Capability
	Helfat & Peteraf (2003)	General	Firm Capability
	Sanchez (2003)	IS	Technological Capability
	Adner & Helfat (2006)	IS	Knowledge Management
	Henderson & Venkatraman (1999)	IS	Strategic Alignment
	Winter (2000)	IS	Innovation
	Dosi (1988)	General	Innovation
	Cohen & Levinthal (1990)	General	Learning and Innovation

The STREMII Model, RBV and DCV theories demonstrate remarkable adaptability across diverse IS domains, underscoring their significance in addressing multifaceted challenges within the field. The STREMII Model, spanning social media, strategic IS, and general IS contexts, excels in crisis communication, showcasing its utility in managing communication challenges during crises and strategic landscapes. RBT seamlessly integrates into IS research, contributing to strategic IS, IT applications development, e-Business, and IS success, emphasizing its influence in strategic contexts and dynamic landscapes. DCV's spectrum of applications extends to general IS, innovation management, technological capability, knowledge management, and beyond, positioning it as a vital theory in shaping adaptive organizational landscapes. Collectively, these theories serve as indispensable frameworks, contributing to crisis communication, strategic planning, resource optimization, and innovation management, highlighting their paramount importance in the evolving landscape of IS research and practice.

4.5.2 Applications in this Research

In the context of this research, the STREMII Model, RBT, and DCV theories were applied to unravel the multifaceted nature of social media communication activities during emergencies and disasters. Specifically, the STREMII Model offered a comprehensive lens for examining communication strategies of the EDMOs when utilizing social media for crisis communication. This model highlighted the interplay between individual and collective behaviours, the role of technology in shaping communication patterns, and the importance of organizational strategies in managing social media engagement. The purpose of the RBT and DCV theories in this research was to identify the specific resources and capabilities related to social media that could enhance emergency and disaster communication on social media platforms. The RBT and DCV theories were used to explore how the EDMOs (can) improve their performance by effectively managing and owning internal resources, knowledge, and capabilities. Thus, the initial focus was on the application of the STREMII model to examine the operational and communication strategies employed by the EDMOs in the Accra floods and COVID-19 pandemic. Subsequently, the RBT and DCV theories were employed to assess the potential of social media in enhancing the communication resources and capabilities of the EDMOs.

The application of these theoretical frameworks enabled the researcher to develop a deeper understanding of the dynamics of social media communication during emergencies and disasters. The findings of this research have significant implications for both practitioners and researchers in the field of IS, and they contribute to the ongoing development of IS theory. For practitioners, the research provides valuable insights into how to effectively manage social media communication during crisis situations. For researchers, the study contributes to the broader IS discourse by providing a more understanding of the role of social media in crisis communication. Overall, the application of the STREMII Model, RBT, and DCV theories to this research has significantly enhanced our understanding of social media communication during emergencies and disasters.

4.6 The Theories and Interpretivism

The interpretivist paradigm, characterized by the belief that reality is socially constructed and subjective, emphasizing the importance of understanding individuals' perspectives and meanings (Smith, 1983), aligns with the STREMII Model, RBT, and DCV theories. These theories, in their application, echo interpretivist principles and mutually reinforce each other. For instance, the STREMII Model delves into the nuances of individual and collective

behaviours during emergencies, aligning with the interpretivist emphasis on understanding diverse perspectives (Smith, 1983). Similarly, RBT and DCV often find expression in qualitative research approaches, allowing for in-depth exploration and context-specific insights (Barney, 1991; Teece, 2007). Additionally, the theories consider contextual factors, acknowledging the context-specific nature of resources and capabilities (Barney, 1991; Teece, 2007b). The emphasis on human agency, central to both interpretivism and these theories, is evident in the STREMII Model's focus on the interplay of individual and collective behaviours, RBT's recognition of the role of individuals in leveraging resources, and DCV's highlighting of the dynamic nature of organizational capabilities shaped by human actions. Moreover, the iterative research process inherent in interpretivism aligns with the ongoing refinement and adjustment involved in the application of these theories (Smith, 1983; Teece, 2007b). This symbiotic relationship enhances the depth and richness of this research that leveraged these theoretical frameworks within an interpretivist paradigm.

4.7 Justification of Theories

The utilization of the STREMII model, the RBT, and the DCV as the theoretical framework for this research is grounded in several justifications, affirming their aptness for studying dynamics of utilizing social media in disaster communication as discussed in the sections below. These theories collectively offer a holistic understanding of the processes involved in utilizing social media during disaster events. The STREMII model emphasizes the strategic and tactical aspects, while RBT and DCV provide insights into the crucial role of resources and dynamic capabilities, ensuring a comprehensive examination of the phenomenon.

4.7.1 Justification of the STREMII Model

The selection and utilization of the STREMII Model in this research are purposeful and well-founded, driven by its inherent capacity to address both strategic and tactical dimensions of social media use during disasters. By incorporating the STREMII Model into the research framework, an explicit effort was made to ensure a well-rounded exploration that extended beyond overarching strategic goals, delving into the day-to-day aspects of managing information in crisis situations. The strategic dimension of the STREMII Model allowed for an in-depth analysis of the objectives related to social media communication during disasters (Stewart & Wilson, 2016). This aspect ensures that the research is firmly anchored in a broader strategic context, considering the overarching goal the EDMOs aim to achieve through their social media endeavours during crises. Simultaneously, the tactical dimension of the STREMII

Model brought granularity to the research, enabling an exploration of the practical, day-to-day activities involved in utilizing social media for communication during disasters. This inclusion recognizes the dynamic and fast-paced nature of crisis situations, where real-time decision-making and communication play a pivotal role. This dimension ensures that the research did not only remain at a theoretical or strategic level but delved into the operationalizing social media strategies in the field. Therefore, the STREMII Model's dual focus on both strategic and tactical dimensions aligns with the research's objectives, offering a comprehensive framework that caters to the multifaceted nature of social media use in disaster communication. This strategic and tactical integration ensures that the research not only contributes to theoretical insights but also provides practical implications for organizations and emergency management entities engaged in social media communication during crises. In essence, the justification for the STREMII Model lies in its ability to bring a holistic perspective to the examination of social media dynamics in disaster contexts.

4.7.2 Justification of the RBT Theory

The adoption of RBT within this research is underpinned by its value in providing a distinctive perspective that underscores the key role of resources— both tangible and intangible— in attaining and sustaining optimal outcomes. In the specific context of disaster communication, where the availability and effective utilization of resources are of paramount importance, RBT emerges as a structured approach to comprehending how the EDMOs strategically leverage their resources to facilitate effective communication. RBT's emphasis on resources aligns with the challenges posed by disaster communication, where the efficient allocation and management of resources can significantly impact the ability to communicate timeously and provide relevant information. The tangible resources, such as technological infrastructure and communication tools, and intangible resources, including knowledge and expertise, become crucial components in the arsenal of entities engaged in disaster communication. By adopting the RBT lens, this research gains a better understanding of how the EDMOs strategically deployed their resources in the landscape of disaster communication. The theory provides a framework to analyse how organizations build, deploy, and renew their resource base to navigate the challenges posed by crises (Teece et al., 1997). It offers insights into the strategic decision-making processes regarding resource allocation, enabling a comprehensive examination of how organizations optimize their resource portfolio to enhance the effectiveness of their communication endeavours during disasters (Barney, 1991; Zhu et al., 2004).

Furthermore, RBT's applicability extends to the examination of how the EDMOs harnessed their unique resources to differentiate themselves in the realm of disaster communication. Whether it be through technological innovations, exclusive partnerships, or accumulated knowledge, RBT allowed for a systematic exploration of the diverse ways in which resources contribute to competitive advantage in the specific context of disaster-related communication. In summary, the justification for incorporating RBT lies in its capacity to enrich the research by offering a resource-centric perspective that is particularly pertinent to the challenges and dynamics inherent in disaster communication. RBT not only acknowledges the critical role of resources in this context but also provided a structured framework to dissect and comprehend the strategies employed by the EDMOs for effective communication during crises.

4.7.3 Justification of DCV Theory

The inclusion of the DCV theory within this research is substantiated by its unique contribution in tandem with the RBT theory. DCV serves as a complementary lens by focusing on EDMOs' ability to adapt, renew, and innovate in response to dynamically changing circumstances. This is particularly crucial in the context of disaster communication, where the dynamic and unpredictable nature of crises necessitates an agile and responsive approach.

DCV's emphasis on adaptability aligns with the challenges posed by disasters, which often require entities to swiftly adjust their strategies and capabilities in real-time to effectively leverage social media for communication purposes. By integrating DCV into the research framework, the study gains a comprehensive understanding of how organizations cultivate and deploy dynamic capabilities to harness the full potential of social media in the rapidly evolving landscape of disaster communication.

In disaster scenarios, where conditions can change rapidly, DCV offered a structured approach to explore how the EDMOs possess specific capabilities and dynamically adjust and deploy them to seize emerging opportunities or navigate unforeseen challenges. The three key processes of DCV—*sensing*, *seizing*, and *transforming* (Teece, 2007a) —become particularly relevant in the context of social media use during disasters. Sensing involves perceiving changes in the external environment, such as shifts in public sentiment or emerging trends on social media platforms. Seizing entails the rapid mobilization of resources and capabilities to capitalize on identified opportunities or address imminent challenges. Transforming focuses on the organization's ability to modify or develop new capabilities in response to changing circumstances. By justifying the integration of DCV into the research, the study uncovered the

static possession of resources and the dynamic processes through which the EDMOs optimized and adapted their capabilities for effective disaster communication. This lens enriched the research by providing insights into how the EDMOs navigate the evolving landscape of crises and leverage social media as a dynamic tool for communication, aligning their capabilities with the changing demands of disaster scenarios.

4.8 Chapter Summary

This chapter explored the theoretical foundations guiding the research, involving the STREMII Model, RBT theory, and DCV theory. As the research focuses on the dynamics of social media utilization in disaster communication, the selection of these theories is justified by their relevance to processes, resources, and capabilities inherent in this context. The STREMII Model is examined for its ability to address both strategic and tactical dimensions of social media use during disasters. This dual focus ensures a holistic exploration, encompassing overarching strategic goals and the practical, day-to-day aspects of managing and disseminating information in crisis situations. The RBT theory is justified by its valuable perspective on the critical role of resources— both tangible and intangible— in gaining and sustaining an optimal communication during disasters. In the realm of disaster communication, where resource availability is pivotal, the RBT provides a structured approach to understanding how organizations strategically leverage their resources for effective communication. The DCV theory is introduced as a complementary lens to RBT, spotlighting an organization's adaptive and innovative capacity in response to dynamic circumstances. Given the dynamic and unpredictable nature of disasters, DCV becomes instrumental in exploring how the EDMOs dynamically adjust their capabilities to harness the potential of social media for communication purposes. The chosen interpretivist paradigm, rooted in the belief in socially constructed and subjective reality, aligns with the selected theories. This alignment is briefly illustrated, emphasizing how interpretivism and these theories mutually support one another in the pursuit of more insights into social media dynamics during crises. The chapter concludes by rationalizing the selection of these theories and highlighting their aptness in comprehending the phenomena under investigation. However, it also underscores certain limitations associated with these theories, acknowledging the need for a consideration of their applicability in specific contexts such as this research. This sets the stage for a theoretical foundation that guides the subsequent empirical exploration and analysis in the ensuing chapters.

CHAPTER FIVE
METHODOLOGY

5.1 Introduction

This section presents the research methodology used in this study to investigate the extent to which social media platforms are used as a tool for communicating emergency and disaster events. Based on the research questions and the gaps in existing literature, a qualitative approach using an interpretive research philosophy is adopted as the best approach for this work.

The philosophical assumption for conducting this study is based on interpretive research philosophy, which asserts that knowledge of reality is derived through social constructions (Kaplan & Maxwell 2005). Interpretive research has seen much more usage in information systems research and has been applied in various areas of information systems research such as system design, management of information systems and social implication of information systems (Walsham, 2011).

To provide answers to the research questions a qualitative method using an interpretive approach was required. The foundations of the research were built on the limited understanding of the extent to which social media is being used as a tool for communicating emergencies and disasters as discovered during the literature review. The opportunities that qualitative methodology provides to studies of this nature were taken into consideration. Qualitative methods consider the views of research participants, provide rich and deep data, and analyse theories and concepts that arise from the data (Bryman, 2012). It was essential to understand the values that shape the deployment of social media for communicating emergency and disaster events. This research therefore required an understanding of the values which may not be noticeable on social media. Hence, in an attempt to infer meaning from the results, control of researcher bias and assumptions would be difficult. To address this, a qualitative approach was used which enabled the views of the participants to have a weight, therefore, using the qualitative method was valuable for this research.

This section will first elaborate on the research philosophy and approach and how they were applied in this study. Then an overview of the research design is explained followed by research strategy and a summary of the methods used for data collections and analysis with a brief

description of the sampling design. The data management plan is also presented after discussing ethics related issues in the research.

5.2 Research Philosophy: Interpretivism

An interpretive research paradigm was adopted for this research. In interpretive research the assumption is that reality is perceived through social constructions like artifacts, documents and shared meaning (Klein & Myers, 1999). In information systems research, interpretive research can help in the understanding of a phenomenon in its context and human thoughts and actions in organizational and social contexts which allows a comprehensive analysis of information systems phenomena (Klein & Myers, 1999). Thus, interpretive research provides an opportunity for users of information systems to state their experiences and opinions from their perspectives (Orlikowski & Baroudi, 1991).

Interpretive research aims at understanding how members of a social group form their realities and give them meaning and helps to show how these meanings constitute their social action. The interpretive paradigm therefore attempts to "*understand the inter-subjective meanings embedded in social life*" (Gibbons, 1987, p.3) which helps "*to explain why people act the way they do"* (Gibbons, 1987, p.3). The assumption in this research is that reality cannot be derived in a hypothetical manner rather it can only be derived by engaging with those who are generating it. The nature of the research problem makes interpretive approach an ideal methodology for this research. In this work, the use of social media by the emergency and disaster management organizations (EDMOs) is conceptualized as a necessity for effective communication of emergencies and disasters. The relationship between technology, people and social settings dynamically influences the activities of actors within the EDMOs in their application of social media in respect to their work routine. Believing in these assumptions guided the researcher to see interpretivism as the most suitable approach to study and understand the relationship between participant's thoughts and actions, the social settings, and the technological factors. Thus, the interpretive approach allowed the researcher to make a detailed investigation of the extent of usage of social media among the EDMOs in general and to have an in-depth knowledge of the impact of the utilization of social media as a tool for communicating emergency and disaster events. Taking the interpretive position allowed these phenomena to be studied comprehensively.

The primary argument of interpretive research is that people respond to situations based on their understanding which usually arises from social interactions and this can be studied and

understood by using the interpretive research process (Boland, 1979). The study of social media communication is contextual and the extent of its usage for emergency and disaster communication is based on available resources, capacity, expertise, personnel and social settings. Using an interpretive approach helped in studying and understanding the phenomena in its natural setting through the lens of the participants and it allowed them to express their views and to draw on their experience.

There are three main paradigms which are largely discussed and used in information systems research which are *the positivist, critical,* and *interpretive* paradigms (Klein & Myers, 1999). The *positivist* paradigm is one of the approaches used in natural sciences which is being adopted for information systems research (Neuman, 2003; Orlikowski & Baroudi, 1991). Positivist researchers mostly test hypotheses usually through quantitative data by employing surveys, statistical and experimental analysis (Orlikowski & Baroudi, 1991). Despite the success of the positivist paradigm in natural sciences, it is not the most suitable paradigm for information systems research as it is weak in capturing complex and subjective phenomena outside the determined variables (Galliers & Land, 1987).

The *critical* paradigm revolves around gender, ethnicity and class in society and it emphasizes on issues such as resistance, power and domination (Brooke, 2002). Critical theorists are seen as social critiques and they use research in revealing the status quo and by either challenging or supporting it (Myers, 1997) while social theorizing the events (Creswell, 2007). In the information systems domain, researchers use critical theory to study interests of a particular group of people and how they are assisted and influenced by a specific information system design or use (Dubravka, 2011). Thus, critical theorists tend to start their inquiries with an assumption about what is good and asking participants in an organization or social group to reflect and query their present knowledge and experience in relation to the identified values. Critical paradigm would not be appropriate for this research because "*rather than naming and describing, the critical theorist tries to challenge guiding assumptions*" (Cohen & Crabtree, 2006).

In the *interpretive* paradigm, researchers rely on the understanding of the problem through social constructions and sharing of meaning by the participants such as their social media communication and the entire atmosphere of the research context (Klein & Myers, 1999). Interpretive paradigm helps information systems researchers to study human thoughts and actions in organizational and social contexts which allow them to attain a better understanding

of information systems phenomena (Klein & Myers, 1999). This research adopted interpretive paradigm to address the research questions due to the following:

- The nature of the main research question which is "*To what extent is social media currently and potentially used as a tool for emergency and disaster communication?"* This primary driving research question, which seeks a better understanding of the usage of social media as a tool for communicating emergency and disaster events, was guided by interpretive views through exploration of the literature and investigation and interaction with the context of study.
- The fact that a number of existing studies on social media communication (e.g., Dufy, 2015; Ehnis, 2017; Ehnis et al., 2014; Graham, Avery & Park, 2015; Knox, 2023; Nina et al., 2023; Parsons, 2018; Power & Kibell, 2017) used case studies efficiently as the research methodology which are essentially interpretive in nature. The usage of social media as a communication tool especially for emergency and disaster events is an under-research area and an emerging phenomenon in information systems research which warrants continual investigation for rich contextual data. The use of interpretive paradigm in studies such as this allows researchers to focus on the complexity of emerging phenomenon and to fully understand and conceptualize the phenomenon (Kaplan & Duchon, 1998). Therefore, the application of interpretive research has the potentials of driving a new and rich understanding of the nature of social media usage among emergency and disaster responders and to answer the research questions properly.

5.2.1 Interpretive Methodological Considerations of this Study

In ensuring quality of data gathering and analysis, Klein and Myers' (1999) seven principles for interpretive research in IS underpinned this research. Developed from hermeneutics, the seven principles are meant to address the issues of quality in interpretive research and were applied by Klein and Myers (1999) to review three published works. The seven principles have gained recognition as a framework for evaluating knowledge claims arising from interpretive research. They are regarded as tools for assessing the generalizability of interpretive research as stressed by Gregor (2006). The seven principles were consistently applied throughout the study to the extent that they evolved into subconscious processes. For instance, the principle regarding interaction between the researcher and subjects is not something that can be consciously implemented at specific intervals. Instead, once the essence of the principle was grasped– that every interaction between researcher and subject inevitably influences the study's

outcomes– it became ingrained in the research process at a subconscious level. Consequently, these principles were not merely employed as sequential steps to guide the research; rather, they operated as inherent, unconscious elements throughout the research journey. This aligns with the original intention posited by Klein and Myers (Klein & Myers, 1999, as cited in Trusler, 2004). Nonetheless, it is essential to acknowledge that some principles were applied more extensively than others. Table 5.1 functions as a self-evaluation, delineating the degree to which each principle was integrated into the study.

Table 5.1 Principles for Interpretive Research (Klein and Myers, 1999).

Principle	Depth of Application
1. *The Fundamental Principle of the Hermeneutic Circle*: This principle suggests that all human understanding is achieved by iteration between the interdependent meaning of *parts* and the *whole* they form. This principle of human understanding is fundamental to all the other principles.	Detailed
2. *The Principle of Contextualization*: Requires critical reflection on the social and historical background of the research setting, so that the intended audience can see how the current situation under investigation emerged.	Detailed
3. *The Principle of Interaction between the Researchers and the Subjects*: Requires a critical reflection on how the research materials (or "data") were socially constructed through the interaction between the researchers and the participants.	Good
4. *The Principle of Abstraction and Generalization*: Requires relating the idiographic detail revealed by the data interpretation through the application of principles one and two to the theoretical general concepts that describe the nature of human understanding and social action.	Good
5. *The Principle of Dialogical Reasoning*: Requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings ("the story which the data tells") with subsequent cycles of revision.	Good
6. *The Principle of Multiple Interactions*: Requires sensitivity to possible differences in interpretations among the participants as are typically expressed in multiple narratives or stories of the sequence of events under study. They are similar to multiple witness accounts, even if all tell it as they saw it.	Fair
7. *The Principle of Suspicion*: Requires sensitivity to possible "biases" and systematic "distortions" in the narratives collected from the participants.	Good

5.2.1.1 Factors Influencing Application of the Seven Principles

The implementation of the seven principles in the study was influenced by various factors that guided their integration into the research process. These influencing factors played a role in determining the depth of their application and the manner in which they were manifested throughout the study. However, it is important to recognize that certain principles received more extensive application than others as explained below.

Principle 1: The Fundamental Principle of the Hermeneutic Circle

The hermeneutic circle, identified as the first among the seven principles and seen as the overarching principle of hermeneutic interpretivism, not only served as a guiding force in the data analysis section but also played a key role in shaping the entirety of the study. This principle requires an iterative examination of both the *whole* and its *parts* in a study, forming the foundation of data analysis, as illustrated in Figure 5.1. The interviews and secondary data sources underwent continuous examination and analysis, initially treated as standalone documents that make sense on their own and subsequently considered in relation to other data and the study as a whole. This practical approach involved creating diagrams highlighting the crucial aspects of each data piece, which were then merged into summary diagrams representing clusters of interconnected data. For example, the first round of interviews was treated as a unified grouping of related data artifacts, resulting in a single summary diagram. Finally, a high-level diagram depicting the key emergent themes was generated. Chapters six and seven detailed the individual *parts*, while chapter eight, the discussion chapter, extended the overall framework by applying the STREMII model, RBT, and DCV theories to provide a comprehensive depiction of the *whole*. Thus, chapter eight utilized the themes identified in the analysis sections, integrating them to form an overall picture. Throughout this process, an approach of continuous reflection was embraced, with the hermeneutic cycle consistently aiding in the analysis process.

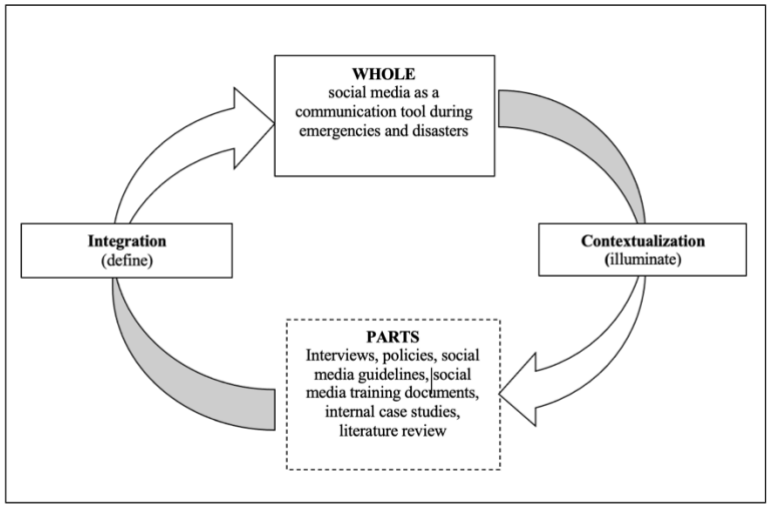

Figure 5.1 Use of Hermeneutic circle in the study (adapted from Paterson and Higgs, 2005).

Principle 2: The Principle of Contextualization

The principle of contextualization requires setting-up the social and historical background of the research to give the audience an account on how the current phenomena under study emerged (Klein & Myers, 1999). In other words, contextualization can be seen as understanding the social and historical context of the present situation. To apply this principle in this research, a firm understanding of the research area was generated through a review of existing literature, social media policies, guidelines, training manual and internal processes of the case organizations. Also, contextualization was carefully executed by considering cultural values of the EDMOs. Understanding the cultural values is crucial when exploring communication practices, especially in the context of the EDMOs. The cultural lens allowed for a more accurate interpretation of the participants' responses and shed light on how cultural factors influence the utilization of social media in emergency communication. The contextualization extended beyond the immediate research focus by providing an overview of the current state of emergency and disaster communication on social media in general. This broader perspective set the stage for a more informed exploration of the specific practices and challenges faced by EDMOs in Ghana. By placing the research within the larger context of global social media trends in emergency communication, the study not only gained depth but also contributed to the broader discourse on effective communication strategies during crises. The presentation of the present status of emergency and disaster communication on social media served as a foundation for understanding the landscape within which the Ghanaian EDMOs operate. It offered a comparative lens, enabling the researcher to draw connections between global trends and local practices. This comparative approach added richness to the

analysis and allowed for the identification of unique challenges and opportunities specific to the Ghanaian context.

Principle 3: The Principle of Interaction between the Researchers and the Subjects

This principle requires a reflection on how the research data is obtained through the interaction between the researcher and the participants and the effect of data collection and interpretation on each other (Klein & Myers, 1999). It is a reciprocal interaction where both parties influence each other's understanding of the phenomenon being studied. This principle was notably observed, especially in the initial phases of data collection, wherein the researcher established initial contact with the subjects. During this stage, attention was paid to understanding the contextual nuances surrounding the interactions, ensuring that the research process unfolded within the appropriate framework of understanding and respect for the subjects' backgrounds and perspectives. However, the long-term impact of these interactions remains somewhat ambiguous, primarily due to the study's relatively short time frame. While the immediate effects of the interactions may not have been fully realized within the confines of this study, it is conceivable that the publication of this research could serve as a catalyst for reflection among the subjects which could potentially spark transformative changes in the perspectives and practices of the subjects involved.

Principle 4: The Principle of Abstraction and Generalization

In this principle, researchers are required to relate interpretation of data with theories and the data must be explained with the help of theories or concepts that describe the nature of social action (Klein & Myers, 1999). The discussion chapter (chapter eight) within this thesis elucidates the case studies, employing the STREMII model, RBT, and DCV theories as analytical tools. These frameworks not only facilitate a comprehensive understanding of the specific cases but also offer insights that can be abstracted and generalized across diverse contexts. The subsequent conclusion chapter (chapter nine) goes on to underscore and reinforce these generalizable points.

Principle 5: The Principle of Dialogical Reasoning

The Principle of Dialogical Reasoning necessitates acknowledging potential contradictions between the theoretical preconceptions that guide the research design and the actual findings, prompting subsequent cycles of revision. Chapters eight and nine offer substantial support for the implementation of this principle. For example, the study challenges the conventional portrayal of disaster response as a linear or cyclical process, as suggested by the STREMII

model. Instead, the research reveals that in the African context, these phases do not adhere strictly to a sequential progression. Rather, they exhibit significant overlap, fostering a more interlinked framework for disaster response.

Principle 6: The Principle of Multiple Interactions

The Principle of Multiple Interactions requires an examination of the influences of the social settings on the actions under investigation by gathering and recording multiple viewpoints and differences in interpretations. The application of this principle within the analysis section could have been more comprehensive. Many of the identified themes were examined predominantly from a single perspective. A more thorough application of this principle could have been achieved with the involvement of a second researcher to help in highlighting possible differences in interpretations among the participants. However, as a single coder in this PhD study, such collaboration was not feasible.

Principle 7: The Principle of Suspicion

This principle requires that researchers be sensitive to *"possible "biases" and systematic "distortions" in the narratives collected from the participants"* (Klein & Myers, 1999, p. 72). This principle is intricately connected to principle six. Yet, it operates at a more subconscious level, particularly when navigating the complexities of multiple actors, each with their own interests and priorities. In such contexts, it becomes increasingly difficult to dismiss remarks without a degree of suspicion, especially when they appear to be influenced by an underlying agenda. This principle assumes particular prominence during the analysis and discussion phases of the study, underscoring the need for researchers to exercise discernment and vigilance when interpreting participant narratives.

5.3 Research Approaches

The choice of a research approach holds significance, as the selected methods can either enhance or constrain the research study, ultimately enabling the researcher to fulfil the research objectives (Marshall & Rossman, 2011). The distinctions, strengths, and weaknesses between qualitative and quantitative research have been extensively discussed, particularly within the realm of social sciences (Kaplan & Duchon, 1988; Orlikowski & Baroudi, 1991). The decision to opt for a quantitative or qualitative design is inherently a philosophical one. Researchers make this choice based on the nature of the research, the required information, the study context, and the available resources such as time, money, and human capital. Despite sharing fundamental scientific principles, both approaches demand meticulous and systematic methods

to obtain quality data (Neuman, 2003). However, they significantly diverge in various aspects. Quantitative research relies on measurements and counts, while qualitative research centres around meanings, concepts, contexts, descriptions, and settings (Orlikowski & Baroudi, 1991). The former involves the analysis of numerical data, whereas the latter involves the examination of non-numerical data, such as words from interviews, pictures from videos, or objects like artifacts (Miles & Huberman, 1999).

Qualitative methodologies and interpretive viewpoints have been extensively employed in information systems research (Conboy, Fitzgerald & Mathiassen, 2012; Kaplan & Duchon, 1988). In alignment with this tradition, this study also aims to enhance understanding of the phenomenon through qualitative research. This choice stems from the necessity for a comprehensive understanding of the extent to which social media functions as a tool for emergency and disaster communication—a crucial aspect in addressing the research problem. Such an investigation typically unveils issues that may not be adequately explored or measured solely through quantitative methods. The data collected from the field are remarkably rich, surpassing the mere categorization and identification of relationships required for analysing the situation. Employing qualitative methods for in-depth data collection and analysis becomes imperative, offering a more intricate understanding of the phenomenon in question.

Various methods constitute qualitative research which typically include interviews and observations but may also include case studies, surveys, and historical and document analyses. (Savenye & Robinson, 2005). In contrast to quantitative research, qualitative methods empower researchers to generate more comprehensive explanations and rich data derived from the studied context (Markus & Robey, 1988). As previously mentioned, this study predominantly employed qualitative method and an interpretive perspective. This approach aims to offer a diverse and robust set of analyses and interpretations to address the research questions. To address both the primary and secondary research questions, a case study approach was adopted, which is explained below.

5.3.1 Case Study Research

In alignment with the research problem and approach, this study embraced the case study methodology. Case study research, whether singular or multiple, proves particularly valuable in advancing theories (Stake, 2005). For this research, a multiple case study was employed; namely five different Emergency and Disaster Management Organizations (EDMOs) in Ghana

were selected to gather the empirical data. The study design adheres to the interpretive case study guidelines outlined by Klein and Myers (1999).

Case study research involves utilizing diverse data collection methods to acquire information within the natural settings and current context of one or more entities—these entities may be individuals, groups, activities, or organizations (Benbasat et al., 1987). Case studies can manifest as single or multiple-case designs. While findings from both designs are applicable to the proposed theory, they are not necessarily generalizable to the entire population under study (Yin, 2009). Various data collection methods can be integrated into case study research, such as interviews, focus groups, observation, document analysis, and questionnaires (Yin, 2009). Given its typically limited scope, results from a case study are not statistically generalized, as highlighted by Stake (1995). Stake (2005) emphasizes the value of case studies in refining theory and recommends further exploration to establish the boundaries of generalizability, recognizing that not all research instances are suitable for broad generalization. Qualitative case studies are inclined toward particularizing experiences rather than generalizing instances (Patton, 2002; Stake, 2005).

The case study approach is apt for this research due to the under-explored nature of the study's context—social media emergency and disaster communication, particularly within the sub-Saharan African setting. This context merits exploration within its rich and natural environment. The study's objective is to delve into emergency and disaster communication from an IS perspective, focusing on IS within organizations and comprehending ICT usage for emergency and disaster communication. This aligns with Benbasat et al.'s (1987) assertion that the case strategy is well-suited to IS research, especially when technology is relatively novel, and attention has shifted to organizational rather than technical concerns. The case study method is deemed fitting for areas with limited prior studies, as emphasized by Eisenhardt (1989), who notes its appropriateness in exploring new topics.

Yin (2009) categorizes case studies into three types for research purposes: *Exploratory, Explanatory, and Descriptive.*

1. *Exploratory case studies:* These are typically employed to address *'what'* questions, with the aim of developing pertinent hypotheses and propositions for further inquiry (Yin, 2009). Frequently used as a prelude to more extensive studies, exploratory case studies assist in shaping research questions and hypotheses.

2. *Explanatory or causal case studies:* Designed to answer *'how'* and *'why'* questions, these case studies aim to establish whether causal relationships or other connections exist between variables or events (Yin, 2009).
3. *Descriptive case studies:* Primarily used to address *'what'* questions in terms of *'how many'* or *'how much'* (Yin, 2009), the objective is to furnish the researcher with a comprehensive description of the phenomenon under investigation.

Building upon the foundational principles elucidated earlier, the case study conducted in this research can be categorized as exploratory in its essence. The overarching aim of this exploratory case study was to delve into and comprehend the research problem into details. By adopting an exploratory approach, the study endeavoured to develop relevant propositions that will serve as a foundational framework for understanding the research problem.

5.3.1.1 Unit of Analysis and Case selection

The identification of the unit of analysis and the selection of cases represents key considerations in case study research. In this context, an individual case unit is typically conceptualized as a *"system of action rather than an individual or group of individuals"* (Tellis, 1997, p. 1). Yin (2009) underscores the significance of the unit of analysis, proposing five potential units for case study definition: *individuals, decisions, programs, implementation processes,* and *organizational change*. For this study, the designated unit of analysis is the organization, specifically the EDMOs. The examination of the social media communication concept was approached from an organizational perspective, encompassing the entirety of the organization. Consequently, individuals within departments, units, or ICT personnel responsible for providing and managing social media platforms within the organization were identified as potential case study participants. In case study research, the selection of cases holds substantial importance, offering an opportunity to gain comprehensive knowledge of the phenomenon under scrutiny (Collier, Mahoney & Seawright, 2004).

Each of the five organizations is treated as a separate case, reflecting its unique context, operations, and challenges. Data from each case were systematically analyzed to identify common themes and patterns. Similarities and differences in the findings across the five cases were categorized to facilitate a structured analysis. This process involves grouping similar data points and insights into categories that reflect key aspects of the research topic. After categorizing the data from each individual case, these findings were integrated to provide a holistic view. The synthesis involves comparing and contrasting the data from the five cases to

identify overarching themes and trends. This step helps in understanding how different cases contribute to and enhance the overall findings of the research. Based on the aggregated findings, propositions were developed.

Recognizing the complexity of case selection process, Tellis (1997) emphasizes its inherent challenges. Despite these challenges, researchers, including Yin (2009) and Stake (1995), advocate a pragmatic approach to case selection, underscoring the importance of two fundamental factors: *feasibility* and *participants' willingness*. In the context of this study, both of these factors were effectively addressed. Feasibility considerations ensured that the selected cases aligned with the practical constraints and logistical requirements of the research. This involved assessing the accessibility of pertinent information and the organizational dynamics within the EDMOs. Additionally, the willingness of participants played a crucial role in case selection, as the engagement and cooperation of individuals within the identified cases were essential for obtaining rich and valuable insights. By attending to both feasibility and participants' willingness, this study navigated the complexities of case selection, thereby laying a solid foundation for an insightful exploration of the social media emergency and disaster communication landscape within organizational settings. In addition to feasibility and willingness, the case selection process took into account factors such as representativeness and importance. The researcher deliberately chose EDMOs that hold prominence in the context of Ghana, anticipating that they might exhibit best practices in the realm of emergency and disaster response. This consideration added depth and significance to the selected cases, enhancing the potential for uncovering valuable insights that could contribute meaningfully to the broader understanding of social media communication within organizational settings during emergencies and disasters.

5.3.1.2 Sampling Strategy

The sampling strategy employed for the participant selection focused on five Emergency and Disaster Management Organizations (EDMOs) in Ghana. Purposive sampling technique was used for selection of participants for the interviews, aiming to capture the perspectives of individuals with substantial knowledge concerning the communication activities on social media within the case organizations. Out of a target of thirty-five (35) participants, a total of twenty-seven (27) were strategically interviewed, representing diverse roles within the organizations. This included heads of communication units, operations assistants, and personnel specializing in research and ICT. The rationale behind this selection was to ensure a

comprehensive understanding of the communication dynamics on social media, as perceived by individuals with varied responsibilities and insights.

Each interview session was designed to span between thirty to sixty minutes, allowing for in-depth discussions while respecting the time constraints of the participants. The interviews were semi-structured, affording flexibility for follow-up questions based on the responses provided by the participants. This approach facilitated a detailed exploration of the subjects, capturing both breadth and depth in the information gathered. Acknowledging the challenges posed by the COVID-19 pandemic, the study embraced flexibility by offering participants the choice between face-to-face or recorded interviews. For the latter, potential respondents expressing interest in the study received information about the interview process via email. This correspondence outlined the interview procedure, emphasized the rights of the interviewees, and elaborated on the study's purpose. In the case of face-to-face interviews, participants were provided with a consent form on the day of the interview, ensuring ethical standards were upheld throughout the research process. The dual approach to interviews was aimed to accommodate the unique circumstances posed by the pandemic while maintaining the integrity and rigor of the data collection process.

5.3.1.3 Interview Strategy

Interviewing stands out as an essential method for gathering primary data in qualitative research. As highlighted by Seidman (2006), this method aligns with the qualitative research approach, providing a means to delve into the experiences of interviewees. The chosen interview technique for this study is well-suited to its objective: exploring participants' experiences in utilizing social media for communicating emergency and disaster events. Qualitative interviews come in various forms, including *informal, semi-structured,* and *open-ended* interviews (Patton, 2002). Informal interviews rely on spontaneous questions, fostering natural interaction between the interviewer and respondents, sometimes occurring without the respondents' awareness of the interview taking place. In contrast, a semi-structured interview involves the interviewer outlining a set of issues beforehand, serving as a flexible checklist during the interview rather than a strict sequence. Open-ended interviews comprise a predetermined set of questions to be followed in a particular order throughout the interview.

For this study, a semi-structured interview approach was selected. This choice allowed flexibility in exploring emergent themes and ideas, avoiding sole reliance on pre-defined concepts and questions. While the interview questions were anchored in the case study protocol

developed before data collection, they were designed to align with the overarching research goal, preventing the interview from deviating. Respondents were granted ample time for reflection and were encouraged to guide the interview, ensuring a participant-driven discussion. During the interviews, the researcher utilized the questions as a guide, allowing respondents to reflect and lead the conversation. The interviewer prompted respondents based on initial answers, summarized responses for clarification, and probed deeper to ensure a comprehensive exploration of the topics. With the respondents' consent, the interviews were recorded and subsequently transcribed for thorough analysis. This approach aimed to capture the richness of the participants' experiences and perspectives in utilizing social media for emergency and disaster communication.

5.3.2 Data Analysis

Data analysis constitutes the systematic examination of collected data through processes such as scrutiny, categorization, mapping, comparison, and other requisite procedures to address the research questions (Yin, 2009). Described as an interactive model by Miles and Huberman (1999), the data analysis process encompasses various components, namely data collection, data reduction, data display, and conclusion drawing and verifying. In qualitative research, these processes are integral and unavoidable. Contrary to a linear approach where data analysis follows data collection in some research, in this study, the analysis commenced at an early stage, overlapping with data collection. This approach, advocated by Eisendhardt (1989), offers a head start in analysis and capitalizes on the flexibility of data collection. The literature review phase involved developing relevant criteria aligned with the chosen theoretical framework. These thematic criteria served as a guide in data collection, functioning as a filter to reduce unnecessary data (data reduction) (Miles & Huberman, 1999). Additionally, this process directed the flow of data collection in the field, guiding the probing of further questions to respondents if initial responses were deemed insufficient. The advantage of this concurrent data collection and analysis approach is underscored by its ability to refine the research focus early on and adapt to emerging insights. The iterative nature of this technique allowed for a responsive research process, ensuring that data collection remains aligned with the objectives and theoretical framework of the study.

5.3.2.1 Approach to Data Analysis

Interview transcripts, field notes, and observations serve as descriptive accounts in a study, offering a compilation of data rather than providing intended meaningful explanations directly

(Silverman, 2005). The responsibility of making sense of the collected data lies with the researcher, involving the analysis and interpretation of these materials. Two fundamental approaches are commonly employed for qualitative data analysis: *inductive thematic analysis* and *deductive thematic analysis* (Burnard et al., 2008). The inductive approach entails analysing data to generate ideas, where codes emerge organically from the data, requiring little or no predetermined theory or framework (Leech & Onwuegbuzie, 2007). This method utilizes the actual data to derive the structure of analysis (Burnard et al., 2008). In contrast, the deductive approach begins with a predefined framework or idea, using the data to either confirm or negate this established framework. In this case, the researcher imposes their own structure or theories on the data and uses them to analyse the interview transcripts (Burnard et al., 2008). This study employed both approaches in analysing the case study data. Initially, an inductive analysis was conducted to derive preliminary themes solely from within the case data. Subsequently, the findings were subjected to frameworks based on literature and earlier phases of the study, introducing a deductive influence to further refine and justify the identified themes. This process, combining inductive and deductive elements, helps to "ground" the theory (Mangan, Lalwani & Gardner, 2004). The described analysis approaches can be conducted manually or with the assistance of computer-assisted qualitative data analysis software (CAQDAS) packages (Burnard et al., 2008). In this study, NVivo 12 was utilized to analyse the data across various phases, providing a systematic and efficient means of managing and interpreting the dataset.

5.3.2.2 Applying Hybrid Inductive-Deductive Thematic Analysis

The purpose of employing combined thematic analysis was to provide a comprehensive narrative from the perspective of emergency and disaster managers regarding the utilization of social media as a communication tool during disasters and emergencies. The inclusion of deductive thematic analysis facilitated a structured data analysis aligned with the theoretical frameworks. On the other hand, the incorporation of inductive thematic analysis involved generating codes directly from the data itself. By utilizing the hybrid approach, the researcher was able to employ the methods of deductive thematic analysis while also identifying emerging themes through inductive thematic analysis. Figure 5.2 illustrates the six stages of the hybrid thematic analysis, as adapted from Fereday and Muir-Cochrane (2006).

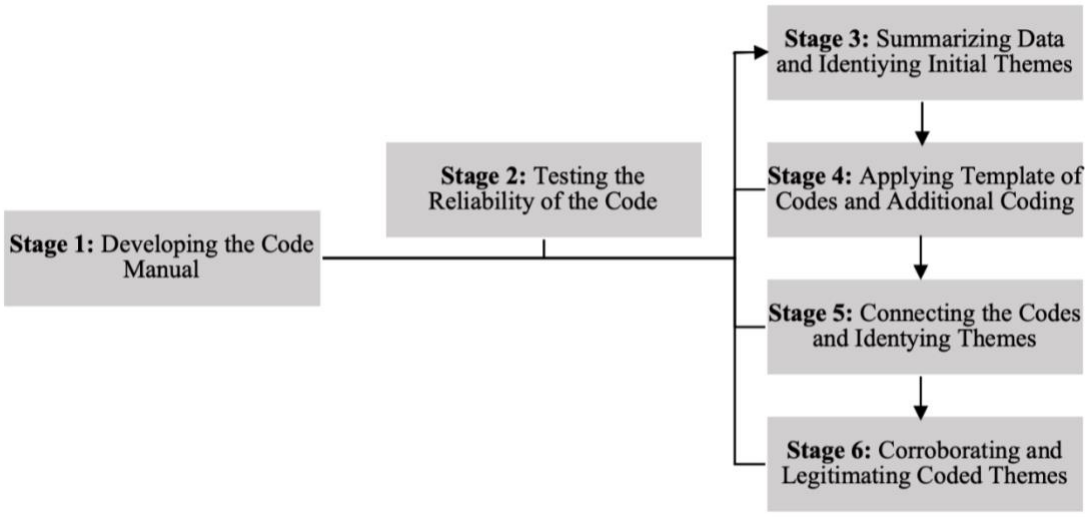

Figure 5.2 Representation of the Stages Undertaken for Data Coding (Adapted from Fereday & Muir-Cochrane, 2006).

- *Stage one: Developing the code manual*

A code manual is essential as it provides a template for data management and referencing for organizing segments of related texts for ease of interpretation (Crabtree and Miller, 1999). In this research, NVivo 12 software was used in managing data as it allows segments of related contents to be connected to a particular code. Initial template of *a prior* codes (deductive) was developed based on the theoretical framework and the research questions. The tasks in this stage ended with the formation of six broad categories for the code manual; *social listening, communication target, crisis response, monitoring and evaluation, interaction with affected population*, and *implementing necessary changes.* Apart from the theory-driven codes (*a priori*), parts of data that described new themes as perceived in the raw data were ascribed *a posteriori* codes (inductive), hence, a hybrid approach. The transcripts of the interviews were read through so that similar opinions were identified and collated to a particular code that best reflect the participants' views.

- *Stage two: Testing the reliability of the code*

To ensure the reliability of codes, it is necessary to test their applicability to the raw data, as suggested by Boyatzis (1998). Typically, inter-coder reliability is employed when multiple coders are involved in the coding process. However, as a single coder in this PhD study, we opted for an alternative approach known as *"dialogical intersubjectivity,*" as described by Saldana (2013). In this approach, the researcher collaborated with his thesis supervisor to discuss and refine the proposed research before fully committing to coding. A pre-coding test

was conducted to examine certain assumptions and make necessary adjustments. The results of this process revealed that a significant portion of the code manual did not require modification. However, two sub-themes — *information gathering behaviour* and *social media capabilities*— were excluded from the code manual due to inconsistencies in categorizing segments of the raw data. Additionally, four other sub-themes— *information searching, cleaning, verification, and analysis strategies*— were merged into one sub-theme to improve clarity and coherence as they essentially involve the same concepts.

- *Stage three: Summarizing data and identifying initial themes*

The process in this stage involved reviewing and analysing the raw data by reading the transcripts and listening to the recordings. The researcher focused on developing a summary of the data while identifying similarities in the participants' responses. This facilitated a deeper understanding of the data and enabled the initial identification and highlighting of themes present in the raw data. This task was critical in the early stages of transcript analysis and also contributed to the summarization of individual transcripts.

- *Stage four: Applying template of codes and additional coding*

In order to identify text units that are pertinent to the research questions, the codes from the code manual were applied to the raw data. Initially, the interview transcripts and documents acquired from the EDMOs were imported into the NVivo data analysis software. The texts were then coded by matching them with data segments that were previously identified as representative of the respective code. The data analysis during this stage was guided by the deductive codes (a priori), but was not limited to them exclusively. Consequently, segments of data that revealed new themes as observed in the raw data were assigned inductive codes (a posteriori).

- *Stage five: Connecting the codes and identifying themes*

The process of connecting codes involves identifying patterns and themes within the dataset (Fereday & Muir-Cochrane, 2006). During this stage, similarities and differences among the data categories that were relevant to the research questions began to emerge. This stage contributed to the highlighting and merging of patterns and themes within the dataset.

- *Stage six: Corroborating and legitimating coded themes*

During this stage, clusters of themes were formed, and a thorough examination of the earlier stages of the hybrid analysis was conducted to ensure that the clustered themes accurately

represented the raw data and assigned codes. Initially, six overarching themes derived from the theoretical framework were developed. As a result of exploring the interrelationships between codes and themes, a total of twelve sub-themes were identified. These final themes were deemed to effectively capture the use of social media as a communication tool by the EDMOs.

5.4 Ethical Considerations

The study complied with all the ethical requirements from the University of Cape Town (UCT) and the EDMOs. Hence, ethics clearance and consent were sought from:

1. UCT in compliance with institutional requirements.
2. The EDMOs for permission to carry out research on their employees and operations.

The primary data source for this work was through interviews. Individual consent from the participants and their rights were stated in the interview cover letters. The interviews were conducted on the date, time, and venue agreed upon by the researcher and the participants. The collected data were anonymized to protect the privacy of individuals and were not used as examples for illustration in this research. Since the participants were given the option of completing the interview via recorded interviews or through face-to-face interviews, the procedure for the interview types were similar. For the recoded interviews, after the potential participant had shown interest in participating in the study, they were provided with information about the interview process via email. An email was sent outlining the interview procedure and highlighting the rights of the interviewee, i.e., consent. It also explained the purpose of the study and the interviewee's rights in more detail. For the face-to-face interviews, a consent form was supplied on the day of the interview.

Consent was also sought from the EDMOs in using their documents (policies, strategy documents, training materials and guidelines.) as back-up data for the research. The following ethical considerations were considered in using the documents:

1. The data were anonymized: all identifying information removed so that it was not possible to identify the participant from the data, directly or indirectly.
2. Direct identifiers such as names and employee numbers were removed.
3. Direct or indirect identifiers that could link to other data or publicly available information sources to identify an individual were anonymized.

5.5 Data Management Plan

This research involved collecting data from interviews. The interviews were digitally recorded (where participants accepted to be recorded) which were fully transcribed automatically then verified manually. In the case where digital recording was not allowed, the interviews were recorded in a notebook. The interview transcripts were digitized and stored in audio and MS word formats. These file formats have been chosen because they are accepted standards and in widespread use. At the end of the research, a long-term preservation of the data would be carried out in accordance with the UCT data management policy. The formatting of data and the provision of metadata were conformed to the UCT standards and guidelines. This also included clear data description, annotation, contextual information and documentation, e.g., unique identifier for each transcript, uniform and consistent layout throughout data collection, cover sheet with interview details such as date, place and interviewee details. Details were kept vague to preserve anonymity.

In the course of the study, the research data was stored on UCT eResearch platform with a backup copy stored on a secured Google drive. This data management plan sought to prepare the research data for future sharing and potential secondary analysis. At the end of the research, therefore, the research data (including anonymised transcripts of interviews where explicit permission for these to be used is given, but not including any audio files) would be deposited for archiving and potential re-use (subject to the ethics approval provisions) in the ZivaHub, UCT's institutional repository for sharing processed datasets. Prior to archiving, the data files will be converted to suitable open formats for long term preservation.

In the upcoming chapters, chapters six and seven, the focus is on data analysis related to emergency and disaster communication on social media. Chapter six provides a broad overview, analyzing general patterns and trends in social media usage during crises. In contrast, chapter seven narrows its focus to specific aspects, exploring social media challenges, available resources, and the capabilities of EDMOs in utilizing social media for effective communication in emergency and disaster situations. The sequential progression from a comprehensive view to a more detailed exploration allows for a layered understanding of the research findings, contributing valuable insights to both academic and practical aspects of emergency management.

CHAPTER SIX

EMERGENCY AND DISASTER COMMUNICATION ON SOCIAL MEDIA

6.1 Introduction

This section presents the findings on the communication strategy of the EDMOs, aiming to address research questions 1.1, 1.2, and 1.3. A total of twenty-seven (27) subjects, including heads of communication units, operations assistants, and research and ICT personnel, were selected as participants due to their substantial knowledge regarding the case organizations and their communication activities on social media relevant to this research. Table 6.1 provides a breakdown of the participants along with their respective roles or departments.

Table 6.1 Overview of case organizations and interview participants

EDMO	EDMO Function	Role/Department	Participants
A	Umbrella organization for coordinating all emergency and disaster events.	Head, Communications	1
		Communications Assistant	2
		Operations Assistant	3
B	Responsible for fire events including fighting bushfires and structural fires in rural and urban area as well as responding to the consequences of storm and flood events.	Research and ICT Personnel	2
		Operations	2
		Public Relations	2
C	Responsible for ccoordinating and executing strategic measures during health crises. This entails developing and implementing emergency response plans specific to health events and collaborating with relevant stakeholders.	Health Communications Department	3
		Advocacy and Social Mobilization	2
		Research and Health Policy Department	1
D	Environment protection and responsible for all hazards.	Operations	3
		General Services	2
E	Protection of life and properties, enforcement of laws, prevention of crimes and ensuring of general security.	Intelligence Directorate	1
		Communications Department	3
		Total	27

In addition to participant interviews, analysis was supported by relevant documents obtained from the case organizations as shown in Table 6.2.

Table 6.2 A Sampling of Documents

Document Title	Data Analysed
National Disaster Management Organization Act (927), 2016 (GoG, 2016)	Communication strategies
Annual Report 2022: National Disaster Management Organization (NADMO, 2022)	Communication strategies and use of technology, dynamic capabilities
Final Report Ghana: Floods (IFRC, 2021)	Communications strategies and resources
Ghana: Floods Emergency Plan of Action (EPoA) Final Report Operation no. MDRGH014 (IFRC, 2018)	Communications strategies and resources
COVID-19: Ghana's Outbreak Response Management (MoH, 2022)	Information gathering and dissemination strategies, resources and dynamic capabilities
Ghana COVID-19 Emergency Preparedness and Response Project (MoH, 2021)	Information gathering and dissemination strategies and resources
Ghana National Fire Service (GNFS) Emergency Response Plan (GNFS, 2019)	Communication strategies, resources and dynamic capabilities
Ghana Disaster Management Training Manual (NADMO, 2017)	Communication strategies and resources
NADMO Executive Workshop/Hands-On Training April 2021	Social media resources and dynamic capabilities
Building capacity of COVID-19 Frontline Health Workers	Resources and dynamic capabilities
Community Engagement and Communication Skills for Health Workers in Ghana (GHS, 2020)	Communication strategies, resources and dynamic capabilities
Nine assorted flyers and posters on COVID-19 communication in Ghana (GHS, NADMO, MoH, MoI)	Resources and dynamic capabilities

The analysis uses the experiences and practices at the case EDMOs to get rich insights. Three theories were utilized, namely STREMII model, RBT theory, and DCV, as frameworks to shape the interview questions, coding and data analysis during the data gathering and analysis process. The STREMII model, as discussed in chapter four, a six-stage cyclical communication process developed by Stewart and Wilson (2016), is a framework used to comprehend the communication strategies of organizations when utilizing social media for crisis communication. The constructs in the model have been adapted to be more relevant to this research as illustrated in Table 6.3.

Table 6.3 The STREMII Model and how it was used in this Research.

The STREMII Model (Stewart & Wilson, 2015)	**Resulting Adaptation**
Surveillance and Social Listening	Social Listening
Targeting the Appropriate Audiences	Communication Target
Responding to the Crisis and Conversation	Crisis Response
Monitoring the Landscape and Evaluating outcomes	Monitoring and Evaluation
Interacting with Consumers and Publics	Interaction with Affected Population

The purpose of the RBT theory and DCV on the other hand was to identify the specific resources and capabilities related to social media that could enhance emergency and disaster communication on social media platforms. The RBT and DCV theories explore how organizations can improve their performance by effectively managing and owning internal resources, knowledge, and capabilities (Miller, 2019). While the RBT focuses on tangible assets, the DCV emphasizes on organizational processes and positions (Marchand, Hennig-Thurau & Flemming, 2019). Hence, in this research, the initial focus was on the application of the STREMII model to examine the operational and communication strategies employed by the EDMOs throughout the various stages of the Accra floods and COVID-19 pandemic. Subsequently, the RBT and DCV theories were employed to assess the potential of social media in enhancing the communication resources and capabilities of EDMOs.

The research employed hybrid inductive-deductive thematic analysis as it allows for a comprehensive and detailed description and organization of datasets (Braun and Clarke, 2006). This technique is not bound to a specific theoretical framework or theory, making it adaptable for analysis within different theoretical frameworks and theories. This flexibility enables researchers to develop themes and effectively address the concern of rigidity in theory usage, thus minimizing the risk of overlooking important emerging themes. Thus, the hybrid approach was employed to leverage the benefits of each method and was based on the recommendation of Fereday and Muir-Cochrane (2006), who proposed that employing a hybrid method leads to a more effective thematic analysis. The analysis process commenced during data collection, with recurrent observations being identified and highlighted. Subsequently, the interview transcripts, along with relevant secondary data, were imported into the NVivo12 data analysis software. The data were then organized into meaningful categories, and codes were generated to capture key elements. Themes that aligned with the research questions were derived by collating similar codes pertaining to specific theme(s). This approach aligns with the viewpoint of Joffe (2012), who defines a theme as a discernible pattern of meaning found within a dataset that addresses one or more research questions.

6.2 Outline of Identified Themes in the Dataset

The data analysis in this research adopted an iterative process, leading to a comprehensive identification of themes associated with the utilization of social media as a communication tool during emergencies and disasters within the dataset. Table 6.4 presents the six main themes

along with their corresponding sub-themes, showcasing the specific research questions (listed below in Table 6.5) they contribute to answering

Table 6.4 Themes and Sub-Themes for First Round of Data Analysis.

Theme	Sub-Theme	Description	Answering Research Question
Social Listening	Information Gathering Strategies	Explores the strategies used by the EDMOs to gather information on social media platforms	1.1, 1.5
	Information Searching, Cleaning, Verification and Analysis strategies	Studies how the EDMOs effectively managed the substantial volume of data generated on social media.	1.1, 1.5
	Addressing Biased and Misleading Information	Investigates how the EDMOs addressed biased information (e.g., worst-affected areas, grappling with power outages and damaged infrastructure may face challenges in accessing or contributing to social media, potentially skewing the information landscape) and misleading information such as fake news, rumours and hoaxes.	1.1, 1.5
Communication Target	External Utilization	Studies the aspects of communication with the general public on social media.	1.1, 1.2, 1.3
	Internal Utilization	Explores the aspects of communication within the organization using social media.	1.1, 1.2, 1.3
Crisis Response	Information Dissemination Strategies	Examines the ways in which the EDMOs share information during emergencies and disasters.	1.2, 1.3
Monitoring and Evaluation	Information Impact	Accesses the impact of shared information on social media by the EDMOs.	1.3
Interaction with Affected Population	Dialogic Communication	Studies how the EDMOs interact with the general public (feedback, tracking and replying to comments— social media as a two-way communication platform).	1.1, 1.5
	Ethical Considerations	Adhering to guidelines and principles in maintaining dignity and privacy during communication	1.1
Implementing Necessary Changes	Addressing Social Media Challenges	Investigates the problems faced by the EDMOs using social media for communication.	1.4, 1.5
	Securing Social Media Resources	Evaluates the tangible and intangible social media resources that EDMOs require to achieve optimal communication outcomes.	1.4, 1.5
	Dynamic Capabilities	Explores EDMOs' set of skills, processes, routines, and dynamic capabilities that are	1.4, 1.5

	regularly used in perceiving and recognizing changes in the external environment, including technological advancements and public preferences.	

Table 6.5 Research Questions (RQ)

No.	Research Questions
1	To what extent is social media currently and potentially used as a tool for emergency and disaster communication?
1.1	In what ways can social media be used for gathering emergency and disaster information?
1.2	How is information disseminated by the EDMOs during emergency and disaster events?
1.3	How did the posted information impact on emergency and disaster risks management?
1.4	What are the current capabilities of the EDMOs in using social media?
1.5	How could their capabilities be increased?

During the data analysis process, an important decision made by the researcher was the choice between selecting themes at the *semantic* or *latent* level. In a *semantic* approach, themes are derived from the explicit or obvious implications of the data, focusing on patterns in the semantic content. This approach involves summarizing and interpreting the data primarily based on the theorized implications of the identified patterns and their broader meanings and significance in relation to existing literature (Braun and Clarke, 2006). In a *latent* thematic analysis, the focus extends beyond the semantic content to identify the underlying ideas, assumptions, and ideologies that inform the observed semantic content. This approach involves interpretive work and offers the potential for theory development, as the analysis goes beyond describing the data and delves into uncovering deeper meanings. In this research, the latter approach, latent thematic analysis, was adopted as it allowed for the exploration of broader assumptions and meanings articulated within the data. The following sections provide a detailed presentation of the data analysis.

6.3 Social Media Platforms

This section delves into the social media platforms employed by the EDMOs for communicating COVID-19 and the Accra floods issues. Broadly speaking, the social media platforms used by the case organizations for this purpose can be categorized as *active use* and *passive use*. *Active use* refers to instances where the EDMOs actively engaged with the public by interacting with their posts, while *passive use* involves primarily sharing information on social media. The findings of the data analysis revealed that the case organizations employed similar social media platforms throughout the different phases of the events, with Facebook

and X (Twitter) being the predominant choices. However, as indicated in the quote below, EDMO E appeared to utilize a greater number of social media channels compared to the other case organizations, and its choice of specific social media services depended on where it expected to find the necessary information.

> *"Our primary social media platforms include Twitter, Facebook, and YouTube. In addition to these, we also utilize WhatsApp, primarily for broadcasting information to media houses. Currently, we are in the process of exploring a few other channels to determine their suitability for our purposes and establish our presence. TikTok and Instagram are examples of such channels where we have initiated some work. However, it is important to note that our current focus remains on Twitter, Facebook, and YouTube, as the majority of our target audience can be found on these platforms..."* Communications Officer, EDMO E.

Table 6.6 presents an overview of the social media platforms employed by the EDMOs, highlighting both active and passive platforms utilized across different phases of disaster management.

Table 6.6 Social Media Platforms used by the EDMOs

EDMO	Platform	Use State	Disaster Phase
A	Facebook	Active	Mitigation, Preparedness, Response
	X (Twitter)	Active	Mitigation, Response
	YouTube	Passive	Response, Recovery
	Snapchat	Passive	Response
	WhatsApp	Passive	Response, Recovery
B	Facebook	Active	Mitigation, Preparedness, Response, Recovery
	X (Twitter)	Active	Response, Recovery
	TikTok	Passive	Response
	Snapchat	Passive	Response
	FB Messenger	Passive	Response, Recovery
C	Facebook	Active	Response, Recovery
	X (Twitter)	Passive	Response
	TikTok	Passive	Response
	FB Messenger	Passive	Response
D	Facebook	Active	Preparedness, Response, Recovery
	X (Twitter)	Active	Mitigation, Preparedness, Response, Recovery
	FB Messenger	Active	Response, Recovery
	TikTok	Passive	Response
	WhatsApp	Passive	Response
E	Facebook	Active	Mitigation, Preparedness, Response, Recovery
	X (Twitter)	Active	Mitigation, Preparedness, Response, Recovery
	YouTube	Active	Preparedness, Response, Recovery
	TikTok	Passive	Response
	WhatsApp	Passive	Response
	FB Messenger	Passive	Response

6.4 Social Listening

This section presents the first theme of data analysis as adopted from the first construct in the STREMII model. *Social listening* is generally referred to as social media monitoring. It is commonly known as the process of identifying and evaluating what is being said about extreme events online. During emergency and disaster events, it is crucial for emergency and disaster managers to have access to actionable information in order to effectively respond and manage the situations. Simply having a presence on social media is not enough; the gathering and analysis of social media data can provide valuable and timely information for decision-making by the EDMOs. In this particular segment of the data analysis, the focus is on the use of social media by the EDMOs for *social listening* activities, with the aim of addressing question 1.1, and is discussed under four subsections: *information gathering strategies**;** information searching; cleaning, verification and analysis strategies;* and *addressing biased and misleading information.*

6.4.1 Information Gathering Strategies

Social media platforms have become an integral part of our daily lives, providing individuals with online networking opportunities and a platform for sharing information. The abundance of data generated on these platforms presents a valuable opportunity for EDMOs to gather insights and analyse information related to disaster events. In this research, the terms *information gathering*, *intelligence gathering* and *data gathering* are used interchangeably. The findings of the data analysis revealed that the EDMOs actively monitored various social media platforms to gather intelligence information during the 2021 Accra floods and the COVID-19 pandemic. The analysis further demonstrated that different social media platforms were utilized for gathering information related to emergency and disaster events for effective decision making. The following excerpts provide evidence of this practice:

> *"…In response to the Accra floods and the recent COVID-19 pandemic, we undertook significant efforts to enhance our disaster communication strategies. As a result, we now utilize a diverse range of social media platforms to actively encourage public engagement and the sharing of relevant content. These initiatives have been instrumental in keeping our communication channels up to date and ensuring the dissemination and access to decisive information during times of crisis."* — Public Relations Officer EDMO B.

The role of social media data collection and analysis in comprehending public responses to emergency and disaster-related issues cannot be overstated. This is buttressed by both the empirical findings of research conducted by Karafillakis et al. (2021) and the insights provided by the study of Pilipiec, Samsten, and Bota (2023). These research endeavours collectively underscore the significance of harnessing the wealth of information generated on social media

platforms during times of crisis. The data gathering strategies employed by the EDMOs, as summarized in Table 6.7, are a reflection of their commitment to staying attuned to the ever-changing landscape of social media. The data gathered from social media tells the stories of people affected by disasters, their immediate needs, and their hopes for recovery. It reflects the concerns and sentiments of the general public and provides a dynamic, evolving snapshot of the disaster landscape. As the EDMOs continue to adapt and refine their data collection strategies, they are poised to leverage the power of social media for the greater good, enabling more effective disaster management and response. Table 6.7 provides an inductive compilation of diverse strategies employed by the EDMOs in gathering information, offering a valuable reference resource from which the EDMOs can gain insights and adapt their own practices.

Table 6.7 Social Media Disaster Information Gathering Strategies used by the EDMOs

Information Gathering Strategy	Description of Gathered Data
Monitoring Social Media	All EDMOs actively monitored various social media platforms (such as Facebook, X (Twitter), TikTok, Instagram) to gather intelligence information during the 2021 Accra floods and the COVID-19 pandemic. They tracked conversations, posts, and updates related to disasters and emergency situations.
Expert Opinions	EDMO C sought opinions from experts, including scientists and health professionals, by closely monitoring their social media accounts. This approach helped gather valuable insights on potential risks and strategies to mitigate disaster events, such as the COVID-19 pandemic.
Indirect Data Collection	EDMO D collected data through key stakeholders, including individuals, local community groups, government agencies, and NGOs. They relied on information shared by these stakeholders on social media platforms and other sources to gather relevant information about disaster events.
User-Generated Content	All EDMOs collected and analysed user-generated content, such as posts, messages, comments, and videos, on social media platforms (e.g., X (Twitter), Facebook) to identify critical issues, assess impending disasters, and develop appropriate mitigation measures.
Public Engagement	All EDMOs actively engaged with social media users to gain insights into their perceptions of risks associated with disasters and pandemics. By understanding the concerns and perspectives of the community, the EDMOs tailored their strategies to meet the community's needs.
Identifying Resource-Stressed Communities	EDMO A used social media platforms to identify resource-stressed communities in need of supplies and aid during disasters. This information facilitated the timely delivery of essential resources to areas in need.
Risk Assessment	EDMO C used social media data for risk assessment. They monitored online discussions on platforms like YouTube and Facebook to evaluate the potential severity and characteristics of the threatening disease (COVID-19).

Real-Time Data Analysis	All EDMOs gathered real-time data from platforms like X (Twitter), Facebook, and YouTube to gain insights into evolving disaster situations, assess their severity, and influence the deployment of support and aid. They actively encouraged the public to share information and used specific hashtags for data collection.
Assessment of Damage	EDMOs A, B, E analysed social media data, including images and text messages, to assess the extent of damage to critical infrastructure (e.g., bridges, roads, buildings) and essential services during and after disasters. The data helped in decision-making and response efforts.
High-Level Information (Raw Data)	EDMO A gathered high-level information through social media, such as images and text messages, to better assess damage, shelter needs, and locate individuals who were unaccounted for or harmed during the Accra floods. Social media data provided reports on specific disaster-related information and requests for assistance.
Eyewitness Accounts	Social media platforms served as sources of eyewitness accounts during disasters. EDMO A, B, D and E relied on these accounts to accurately assess disaster severity, the extent of damage, and the essential assistance needed for saving lives and addressing immediate needs. This information included reports of injuries, casualties, missing persons, and more.
Crowdsourcing	EDMOs A, B and D harnessed the collective power of individuals through social media platforms for crowdsourcing during disaster response efforts. Citizens were encouraged to report conditions, water levels, and damage to property or infrastructure through social media, providing critical real-time data for assessing the situation and responding effectively.
Crowdsourced Fundraising	EDMOs A and C used social media platforms to initiate crowdsourced fundraising campaigns for disaster victims. They mobilized a network of donors through crowdfunding campaigns, efficiently gathering financial resources for relief efforts. This approach allowed them to tap into the generosity of people from around the world.
Crowdsourced Supply Collection	All EDMOs organized crowdsourced efforts through social media to collect essential supplies, such as food, clean water, clothing, and shelter materials. They engaged local communities and individuals to donate these items, ensuring a diverse range of supplies and involving the local community in the recovery process.
Real-Time Needs Assessment	EDMO A relied on reports and feedback from affected individuals and volunteers in the field to determine what resources were needed most urgently. Social media facilitated efficient coordination of relief efforts.
Ongoing Monitoring and Analysis	EDMO C continued to actively monitor social media platforms even after the immediate impact of the COVID-19 pandemic diminished. This ongoing effort aimed to extract valuable insights from posts and messages shared on these platforms, which informed public health initiatives and public policy.

These strategies showcase how the EDMOs leverage social media platforms for data gathering in disaster management and emergency response. While *monitoring social media* as realized in the findings is a strategy in the STREMII model, which played a key role in shaping the research, the remaining strategies emerged from the collected data, adding novel insights to social media research. It is worth noting that the Accra floods and COVID-19 data gathering

strategies share some commonalities and differences in their approaches. Both the Accra floods and COVID-19 data gathering strategies heavily rely on social media platforms like Facebook, X (Twitter) and YouTube. These platforms were used to monitor and collect real-time information. Again, both cases involve crowdsourcing, which is the engagement of the online community in sharing information, reporting incidents, and raising funds. This approach helped in collecting valuable data and resources to support disaster response and recovery efforts. In both cases, the EDMOs emphasized the importance of ongoing monitoring and analysis of social media data. This was done to extract insights, assess the situation, and inform decision-making processes. Social media was used to engage with the public, gather information about public sentiment, and encourage the sharing of relevant content, highlighting the role of public involvement through social media.

In contrast, the sources of data vary between the two scenarios. For the Accra floods, data was often collected from eyewitnesses and the general public sharing information about flood conditions, damage, and casualties. In the case of COVID-19, the data was gathered from expert sources, medical professionals, and professional groups discussing the pandemic. Again, the information needs for these two scenarios differ. For the Accra floods, the primary concern was identifying the location and severity of flood-related damage, injuries, and casualties. In contrast, for COVID-19, the focus was on tracking the spread of the virus, understanding public perceptions, and monitoring health-related discussions. The response activities also differ. For the Accra floods, data gathered from social media were used to assess the extent of damage, raise funds, and collect essential supplies for flood victims. In the case of COVID-19, data helped to shape public health initiatives, influence policy decisions, and gauge public support for measures like vaccination. The information gathering strategies for Accra floods focused on risk assessments to determine potential hazards and impacts. In contrast, for COVID-19, the emphasis was on understanding the disease's characteristics and containment strategies.

6.4.2 Information Searching, Cleaning, Verification and Analysis Strategies

The emergence of social media resulted in a significant influx of data, particularly during crises or disasters and it is therefore important to study how the EDMOs effectively managed the substantial volume of data generated on social media. This includes aspects such as their approaches to searching, filtering, data cleaning (sifting through unreliable or misleading information) and the techniques they applied for analysing the data. Apart from EDMO C and

E who have adopted a mix of technological and strategic approaches, the other EDMOs used improvised techniques.

The employment of *#hashtags* has become an integral part of the search tactics employed by the EDMOs in their quest to gather and disseminate information during crises. One example of this is the use of the *#AccraFloods* hashtag during the flooding incident. In the midst of the flood crisis, the public consistently utilized the *#AccraFloods* hashtag across various social media platforms, with a particular emphasis on Facebook. This hashtag served as a digital rallying point, allowing individuals to share real-time updates and convey critical information pertaining to the flood situation. For EDMO A, the *#AccraFloods* hashtag played a key role in their information retrieval efforts. An officer from EDMO A highlighted the significant reliance on this hashtag for monitoring and extracting relevant data from the vast pool of information circulating on social media. The officer recounted that the hashtag served as a powerful filter, enabling them to streamline their search specifically for content related to the floods. Social media platforms, particularly Facebook, became a source of information, with users contributing first-hand accounts, images, and updates using the designated hashtag. The EDMO officer explained that by monitoring *#AccraFloods* on Facebook, they were able to swiftly access a wealth of user-generated content, which proved invaluable for assessing the situation on the ground.

The use of a variety of search terms also played a significant role in the search strategies of the EDMOs**.** In addition to leveraging hashtags, the EDMOs employed varied and context-specific search terms to enhance their search strategies during emergencies and disasters. Understanding that not all relevant information might be encapsulated within a single hashtag, this approach allowed them to cast a wider net, ensuring that they could capture information from different angles and perspectives related to the emergency at hand. An officer from EDMO E recounted,

> ***"...****in addition to hashtags, we employed a variety of search terms. For instance, location-specific terms like "Accra flooding updates" allowed us to capture a broader information beyond a single hashtag."* Communications Officer, EDMO E.

An officer from EDMO C added by saying,

> *"...hashtags provided a focused lens on the flood-related discussions, but incorporating varied search terms expanded our reach. We were able to capture public updates and news articles that might not have used the hashtag but were still crucial for our understanding of the situation."* Advocacy and Social Mobilization Officer, EDMO C.

The surge of information (information overload) on social media platforms presents a unique challenge for the EDMOs when conducting searches for relevant information. While hashtags served as an effective way to narrow down content related to a specific topic, the sheer volume of data can still be overwhelming. Recognizing this, the EDMOs have employed the inbuilt filters provided by social media platforms, a practice that gained prominence during the COVID-19 pandemic. The COVID-19 pandemic brought with it a flood of information, ranging from official health guidelines to rumours and misinformation. In response to this, the EDMOs use more sophisticated tools to refine their searches. These inbuilt filters allowed the EDMOs to customize their searches based on specific criteria such as relevance, location, and credibility. For instance, during the pandemic, EDMO C utilized social media platforms' filters to prioritize information from official health organizations, government announcements, and reputable news sources. This ensured that the information they accessed was not only relevant but also reliable, critical in a situation where accurate information is paramount. On the other hand, EDMO E leveraged these filters to focus on information specific to their operational needs especially monitoring compliance with public health measures. Thus, these filtering mechanisms helped the EDMOs to check the risk of information overload facilitating the discerning of relevant and reliable information from the noise while preventing the flood of irrelevant and inaccurate data.

One interesting utilization of these filters was used by EDMO C for tracking the *development of information* over time. This was particularly important during the pandemic as recounted by an officer, where guidelines and recommendations were subject to frequent updates. By refining their searches based on the latest information, EDMO C could stay ahead of the curve, adapting their response strategies to the changing circumstances. While the use of filters to track the *development of information* over time during the COVID-19 pandemic demonstrates a proactive approach to staying informed, there are certain aspects that warrant critical examination. The effectiveness of these filters is contingent on the accuracy and timeliness of the algorithmic mechanisms implemented by the social media platforms. If the algorithms fail to adapt swiftly to changes in guidelines or recommendations, EDMO C might inadvertently rely on outdated or incomplete information. Therefore, there is a need for constant scrutiny of the reliability and responsiveness of the filters employed to ensure the organization is not basing critical decisions on obsolete data. Indeed, the reliance on filters in general may pose a risk of creating *filter bubbles* (Jernej, 2022), a situation where *"internet customization effectively isolates individuals from diverse opinions or materials"* (Areeb et al., 2023, p.1).

Filters, by design, limit the scope of information to predefined criteria. While this can be advantageous for streamlining data, there is a potential danger of missing out on diverse perspectives and emerging trends that fall outside the specified parameters. It is essential to approach this strategy with a critical eye. A well-rounded information management strategy should combine the advantages of automation with human oversight, ensuring that the EDMOs are not only adapting to changes but also fostering a comprehensive and unbiased understanding of the evolving circumstances.

The significance of data cleaning in times of emergencies and disasters cannot be emphasized enough. The EDMOs utilized the flagging functionalities on social media platforms, particularly Facebook, as part of their data cleansing efforts. These platforms offer a mechanism to flag or report content that is inaccurate or misleading, a process upon which the EDMOs relied. Despite the fact that the survey participants exhibited a relatively limited understanding of formal data cleaning techniques, practical training materials discovered during data collection from EDMO E underscored the importance of leveraging social media flagging features. Although these materials did not explicitly designate it as a data cleaning method, they emphasized the role of utilizing such flagging functionalities to sift through and address misinformation during emergency response efforts. In addition to relying on social media flagging features, the EDMOs actively engage in the process of fact-checking to ensure the accuracy and reliability of the information they collect during emergencies and disasters. Fact-checking involves an examination of the veracity of information and the EDMOs recognize that misinformation and inaccuracies can propagate rapidly during crises, potentially leading to misguided decisions and public confusion. Therefore, they have incorporated fact-checking into their data cleaning strategies to maintain the integrity of the information being used in their emergency response efforts. Officers in EDMOs A, C and E reiterated the importance of cross-referencing information from credible news sources, and in addition EDMO C sometimes collaborated with subject matter experts to verify the accuracy of data. EDMO D on the other hand conducted on-the-ground verification to corroborate online information as described by an officer,

> *"...during the floods, we received reports about the flooding situation around the Odona bridge. While online reports indicated the severity, our team on the ground was able to assess the situation, confirm it, and provide additional details about the extent of flooding and potential impacts on the area."* Officer in the General Services Department, EDMO D

One notable strength of EDMO D's on-the-ground verification is its direct and first-hand approach. By physically verifying information at the location, EDMO D aimed to eliminate

potential inaccuracies and obtain a more authentic understanding of the situation. This method can be particularly effective in situations where the on-site context is crucial for decision-making. However, conducting physical verification especially at multiple locations can be time-consuming and resource-intensive, potentially slowing down the overall information gathering and response process. The scalability of this approach may be a concern in situations with widespread and rapidly changing dynamics. Furthermore, the speed at which information circulates during emergencies might present a challenge for on-the-ground verification. Real-time decision-making is often crucial in emergency and disaster management, and the time lag introduced by physical verification may hinder the agility required for timely responses.

To extract valuable insights from the gathered data from social media, the EDMOs used various data analysis techniques which are described in Table 6.8 below.

Table 6.8 EDMOs' Social Media Data Analysis Techniques

Data Analysis Technique	Used By EDMO	Description
Content Analysis	A, B and D	Manual content classification to categorize social media content based on its nature. This included distinguishing between requests for help, news updates, and fake news during the floods.
Sentiment Analysis	A and E	Evaluation of the emotional tone of posts shared on social media in terms of negativity and positivity which helped them in understanding public sentiments surrounding the floods. (An officer from EDMO A gave an example of the use of words like "heartbroken," "submerged," and the plea for urgent assistance during the floods which conveyed a negative sentiment. Such posts contributed valuable insights for the EDMOs in understanding the emotional distress and urgent needs of the affected population.)
Network Analysis	C and E	Network analysis was used to identify key influencers, organizations, or individuals who played a big role in sharing information during the COVID-19 pandemic. This involved the manual mapping of social network connections to reveal influential nodes within the information flow, helping the EDMOs' in their public campaign about the pandemic.
Time-Series Analysis	A and C	Tracking the evolution of discussions and trends over time. By analysing how public attitude changed over time on the COVID-19 vaccination, the EDMOs gained insights on the progression of their vaccination campaign.
User Profiling	E	EDMO E engaged in user profiling by creating profiles of key users contributing relevant information on social media. Understanding who is sharing information enhances the credibility assessment of data, allowing EDMO E to prioritize reliable sources.

Multimedia Analysis	A	EDMO A conducted multimedia analysis by analysing images and videos shared on social media platforms. This analysis was focused on gaining situational awareness, including damage assessment, resource needs, and understanding the overall impact of the disaster.

EDMO E opted for a spreadsheet, specifically for creating profiles of significant contributors on social media, whereas EDMO C utilized a word processor to document key influencers and stakeholders. Conversely, the other EDMOs, and in some cases EDMOs E and C as well, performed instantaneous data analysis directly on social media platforms. It is important to highlight that a substantial portion of the data analysis was carried out manually by the EDMOs. While manual techniques offer value, integrating them with automated tools and algorithms can augment efficiency and scalability, especially when dealing with large datasets and rapidly changing situations.

6.4.3 Addressing Biased and Misleading Information

Biases in information pose a significant challenge, particularly in the context of emergencies and disasters, where accurate and timely information is crucial for effective response and mitigation efforts. The worst-affected areas, grappling with power outages and damaged infrastructure, may face challenges in accessing or contributing to social media, potentially skewing the information landscape. The EDMOs have acknowledged the impact of these biases on decision-making processes during crises. In response, EDMO C has actively sought diverse sources of information as related by an officer.

> *"...that is true, certain areas faced power outages and communication challenges so we depended on media outlets such as radio stations and TV channels who provided coverage of issues that were important to us."* Health Communications Officer, EDMO C.

To counteract the effects of underrepresentation, EDMO E has implemented inclusive strategies by recognizing that certain communities might be disproportionately affected by infrastructure issues, and therefore, special efforts were made to ensure their voices were heard. This involved deploying personnel to these areas to gather first-hand information in order to fill the information gaps. Understanding that social media channels may falter in these areas, EDMO E has gone beyond relying solely on remote information sources. Instead, the organization has deployed personnel directly to these communities. These individuals worked on the ground, interacting with affected populations, community leaders, and first responders to gather first-hand information. This hands-on approach not only provides a more accurate

understanding of the situation but also allows for the identification of unique challenges and needs that may be overlooked in broader assessments.

On the other hand, misleading information, deliberately crafted with the intention to misinform or deceive the public, can exacerbate the challenges faced by communities and emergency response efforts. Misinformation, rumours and hoaxes can spread rapidly, leading to confusion, panic, and hindering effective disaster response. It is therefore essential to address misleading information and fake news and to combat their impact during disaster events. An officer from EDMO A emphasized the prevalence of fake news during the Accra floods, highlighting how it spread rapidly through various social media platforms. This widespread dissemination of false information led to a concerning situation where people made misinformed judgments based on unreliable sources. The impact of fake news during the Accra floods was particularly significant due to the speed at which it circulated, compounding the challenges that were being faced and exacerbating the overall confusion and chaos surrounding the event. The officer added the following example,

> *"One example involved a fabricated image circulated on Facebook showing a severely flooded area that was claimed to be Accra. The image, however, turned out to be from a completely different location, leading to a distorted perception of the actual extent of the flooding in Accra. This false depiction contributed to panic and unnecessary concern among residents."* Communications Assistant, EDMO A.

The circulation of misleading information on social media, falsely claiming the involvement of specific organizations in rescue operations during the Accra floods, highlights the pervasive nature of misinformation during disasters as asserted by an officer from EDMO B.

> *"Rumours were circulated on Facebook claiming that certain organizations were conducting rescue operations in specific flood-affected areas which went viral to WhatsApp. This misinformation led to people waiting for help that never arrived, causing further distress and delays in actual relief efforts. The spread of such false reports undermined our rescue operations and hindered the deployment of resources."* Public Relations Officer, EDMO B.

Within the dataset, it was evident that misleading information included the dissemination of manipulated images during the Accra floods, creating a distorted representation of the severity of the situation. An officer from EDMO E stated,

> *"...some individuals edited or shared old footage of previous floods, attributing them to the current event. These misleading visuals distorted public perception and hindered accurate assessment of the actual impact and magnitude of the flood."* Communications Officer, EDMO E.

The above analysis demonstrates the harmful consequences of fake news and misleading information during the Accra floods, affecting various aspects of the response and amplifying the challenges faced by the EDMOs. It is worth noting that similar occurrences of fake news

were observed during the COVID-19 pandemic. As stated by an officer from EDMO C**,** misleading information regarding the treatment of COVID-19 circulated widely, leading to misguided actions among the general public. The officer detailed,

> *"Misleading information spread regarding supposed cures for COVID-19. Unverified claims about the effectiveness of certain medications and home remedies were widely shared on social media, leading some individuals to rely on unproven methods instead of following reliable medical guidance. This not only put their own health at risk but also hindered public health efforts to control the spread of the virus."* Health Communications Officer, EDMO C.

The impact of conspiracy theories and misinformation on public perception and trust in COVID-19 response efforts, as highlighted by an officer from EDMO C, has been a significant challenge throughout the pandemic. The officer emphasized that these false narratives, particularly regarding the origin of COVID-19, have not only led to public confusion but have also eroded trust in public health measures and vaccination initiatives. One concerning aspect noted by the officer is the emergence of various conspiracy theories questioning the origin of COVID-19, with some suggesting it was deliberately created. These unfounded claims not only contributed to misinformation but also fuelled scepticism and mistrust among the public. The resulting confusion impeded the effectiveness of COVID-19 programs, as the public was left uncertain about the nature of the virus and the appropriate measures to combat its spread. A significant consequence of misinformation lay in the vaccine-related claims. The officer recounted how misleading information about vaccine efficacy, safety, and side effects had circulated widely. This proliferation of falsehoods contributed to vaccine hesitancy, an obstacle in achieving widespread vaccination coverage. As a result, the officer noted the challenges faced in slowing down the spread of the virus, as a significant portion of the population remained hesitant or resistant to receiving the vaccine. The officer also highlighted the role of false reports about the side effects following vaccination in fostering unwarranted fears among the public. Such reports, often based on misinformation rather than scientific evidence, had further impeded vaccination efforts. Addressing and dispelling these fears became crucial in rebuilding trust and encouraging the public to participate in vaccination programs essential for controlling the spread of the virus.

The EDMOs were requested to share concrete examples of situations in which they effectively mitigated the dissemination of fake news. An officer from EDMO C recounted,

> *"...we closely monitored social media platforms and other sources like radio and TV to identify and address instances of fake news promptly. By actively monitoring and engaging with the public, we were able to debunk some of the false information, provide clarifications, and redirect individuals to reliable sources..."* Research and Health Policy Officer, EDMO C.

EDMO B has taken a similar approach by recognizing the role of media partnerships, particularly with local television and radio news outlets, in disseminating accurate information during emergencies, such as floods. Understanding the influential reach of television and radio as widely accessible and trusted mediums, EDMO B had prioritized establishing partnerships and cultivating relationships with these outlets well in advance. This foresighted approach created a framework for collaboration that proved invaluable when faced with the urgent need for disseminating accurate information during critical situations like the floods. An officer from EDMO B revealed the significance of this media collaboration in countering false information. In times when the demand for accurate and timely updates is paramount, the organization has seamlessly coordinated with its media partners. EDMO B provided these trusted outlets with verified information and real-time updates, ensuring that the information shared through their broadcasts is reliable and up-to-date. This collaborative strategy has proven instrumental in correcting any misinformation that might be circulating among the public. By leveraging the broad reach of television and radio, EDMO B could potentially counter false narratives and ensure that the public is equipped with credible information. The officer emphasized that this collaborative effort not only helped in dispelling rumours but also provided the community with the necessary information to make informed decisions during the floods.

To combat the spread of fake news, EDMO D took proactive measures by creating dedicated Facebook account and emergency hotlines. These platforms served as reliable and authoritative sources of information, ensuring that accurate updates reached the public swiftly and directly. By leveraging these communication channels, EDMO D aimed to counter misinformation, provide timely updates, and foster trust among the affected communities. These efforts helped to address the dissemination of false information and promote a more informed and resilient response to the crisis as explained below by an officer in the organization.

> *"One of the key steps we took was the establishment of dedicated Facebook account and emergency hotlines as reliable sources of information on the floods. These platforms played a vital role in combating the spread of fake news and ensuring that accurate updates reached the public. Our Facebook account played a role in reaching a wider audience and engaging directly with the public. We actively managed these accounts, promptly addressing rumours, clarifying misconceptions, and providing accurate information in real-time. The hotlines provided a dedicated channel for communication, enabling us to swiftly respond to inquiries, provide accurate guidance, and address concerns."* Operations Officer, EDMO D.

One interesting approach used by EDMO E was collaborating with social media influencers. By collaborating with such influencers, EDMO E aimed to harness their reach and credibility to disseminate critical information to a wider audience. They engaged with these influencers,

providing them with accurate updates and correct information, which they could then share with their followers.

> *"...popular artists in the country helped to some extent in responding to rumours. We were able to tap into their influence within the community which helped in dispelling rumours while ensuring that accurate information was shared widely."* Communications Officer, EDMO E.

By empowering these influencers with reliable information, the EDMO engaged them as valuable allies in the fight against fake news during disasters. Through their collaboration, they harnessed the collective strength of these trusted individuals to amplify accurate updates, counter false narratives, and build a network of reliable information dissemination. This approach proved effective in enhancing the overall response to emergencies and disasters and minimizing the harmful impact of fake news. This initiative not only benefited the emergency response efforts but also proved advantageous for the social media influencers themselves. By being perceived as reliable sources of information, they gained increased trust from their followers, further enhancing their influence. This mutually beneficial partnership not only strengthened the overall communication strategy during crises but also positioned these influencers as valuable contributors to the dissemination of accurate and timely information. In doing so, the EDMOs not only tackled the challenges posed by misinformation but also cultivated a collaborative and informed ecosystem that contributed to more resilient and well-informed communities during times of disaster.

6.5 Communication Target

This section discusses the second theme of data analysis as adopted from the STREMII model. The *communication target* theme was used to study how the EDMOs used social media for both *external* and *internal* purposes to ensure that information was reaching the desired people while helping to provide answers to questions 1.2 and 1.3. Table 6.9 summarizes the key points from the *external* and *internal* utilization of social media in the context of *communication target* as used in this research.

Table 6.9 External and Internal Usage of Social Media for Disaster Communication

Aspect	External Utilization	Internal Utilization
Definition	Employing social media for broader public engagement.	Using social media for communication within EDMOs.
Tactics	▪ Collaboration with influencers and key opinion leaders. ▪ Use of relevant hashtags. ▪ Tagging authorities and influential individuals.	Utilization of WhatsApp for internal communication.

	▪ Deployment of multimedia content. ▪ Active engagement with the public.	
Purpose	Expand reach, exposure, and impact of posts during emergencies and disasters	Facilitate quick and efficient sharing of information within EDMOs.
Examples	▪ Collaboration with influencers for wider audience reach. ▪ Use of hashtags for increased discoverability. ▪ Tagging authorities and celebrities for broader coverage. ▪ Use of multimedia content for visual impact. ▪ Active engagement to foster trust and credibility.	▪ WhatsApp groups as centralized hubs for information exchange. ▪ Group chats and file-sharing for coordination.
Benefits	▪ Wider audience reach and impact. ▪ Enhanced credibility through influencer collaboration. ▪ Effective content discoverability through hashtags. ▪ Broader coverage via tagging influential figures. ▪ Visual impact and increased user engagement with multimedia.	▪ Quick and efficient internal communication. ▪ Streamlined collaboration and task coordination.
Platform Preference	Facebook and X (Twitter)	WhatsApp

External utilization of social media by the EDMOs involves an approach to engage with the broader public during emergencies and disasters. One key tactic is the collaboration with influencers and key opinion leaders on platforms like Facebook and X (Twitter), aiming to amplify the visibility and impact of disaster-related posts. This collaboration not only expanded the reach of the EDMOs' messages but also enhanced credibility through association with influential figures. The incorporation of relevant hashtags served as another vital strategy, allowing the EDMOs to increase the discoverability and visibility of their content. For instance, during the COVID-19 pandemic, EDMO C utilized trending hashtags related to the crisis to ensure their posts appeared in relevant search results and discussions. Additionally, tagging relevant authorities and influential individuals in social media posts is employed to broaden coverage and ensure that critical information reaches decision-makers who can take necessary

actions or provide support. The use of multimedia content, such as images and videos, is a powerful tool for capturing the attention of the public, evoking emotions, and increasing the likelihood of content being shared. Active engagement with the public, including responding to comments and questions, fosters trust and credibility, encouraging user interaction and potentially boosting the visibility of posts through social media algorithms.

On the other hand, internal utilization of social media within the EDMOs focused on communication and collaboration among staff and teams. The primary platform of choice for this purpose is WhatsApp, where dedicated groups served as centralized hubs for exchanging ideas, coordinating tasks, and providing real-time updates. EDMO B, for example, utilized WhatsApp groups during the floods to enhance collaboration and streamline communication among team members. The use of group chats and file-sharing functionalities on WhatsApp enabled effective communication, allowing staff and teams to exchange ideas, coordinate tasks, and share important documents efficiently. This internal utilization of social media proves crucial in facilitating quick and efficient information sharing within the organization, replacing traditional methods such as in-person meetings during emergency situations. The benefits of this approach include streamlined collaboration, improved coordination, and timely dissemination of important information among the EDMO staff, contributing to effective emergency response efforts. Overall, the combination of external and internal utilization demonstrates the versatility of social media in addressing both public outreach and internal communication needs within the realm of disaster management and emergency response.

The STREMII model, as applied in this research, primarily focuses on optimizing social media for external communication, emphasizing aspects like crisis updates, public engagement, and public relations. The model has been instrumental in shaping the discourse around leveraging social media in the context of emergency and disaster management. However, our research sheds light on an equally important and under-explored dimension of the role of social media in organizational dynamics—the facet of internal communication within the EDMOs. Traditionally, the emphasis in the field of emergency and disaster management has been on utilizing social media as a powerful tool for disseminating critical information to the public, coordinating responses, and maintaining a transparent and engaged relationship with the external community. The significance of these external communication strategies cannot be overstated, as they play a key role in ensuring effective communication, garnering public support, and managing public perception during challenging times. Nonetheless, the findings

in this research challenge the conventional narrative by uncovering the equally impactful role that social media plays in facilitating internal communications within the EDMOs. In the face of disasters, internal communication is paramount for coordination, information sharing, and decision-making within the EDMOs. By delving into the internal utilization of social media, the findings demonstrate that platforms like WhatsApp serves as invaluable tools for rapid and efficient sharing of information, updates, and announcements among the staff and teams within the EDMOs. This shift in perspective expands the traditional boundaries of social media application in emergency and disaster management, highlighting its dual functionality. Beyond its external-facing role in disaster communication, social media emerges as a force that significantly contributes to the internal communication dynamics of the EDMOs. This underscores the need for a more comprehensive understanding of the multifaceted role that social media plays in organizational communication during times of emergencies and disasters. By acknowledging the potential of social media for internal communication, we contribute to a more holistic approach to leveraging digital platforms for emergency and disaster management. Thus, recognizing the symbiotic relationship between external and internal communication through social media enhances the overall resilience and responsiveness of the EDMOs in times of emergencies and disasters.

6.6 Crisis Response

In this section, the third theme *crisis response*, was used to study how the EDMOs disseminated information on social media. This theme was instrumental in dissecting various aspects of information dissemination behaviour, a key element encapsulated within the STREMII model. Using this, we explore how EDMOs harness social media platforms to disseminate information during emergency and disaster situations. Information dissemination is a cornerstone in crisis communication, as it ensures that accurate and timely information reaches the public, aiding in decision-making, awareness, and response coordination.

6.6.1 Information Dissemination

Data analysis show that the EDMOs actively shared information during the Accra floods which impacted coastal areas of the Greater Accra region. An officer from EDMO B stated,

> *"...upon learning from news outlets that Accra would likely be affected by the storm, we promptly initiated the use of the hashtag #AccraFloods to alert communities about the anticipated heavy rains in the upcoming week. This hashtag gained widespread usage among news media and the general public. As the floods eventually occurred, we consistently employed the hashtag to provide clear updates and cautionary messages...."* Public Relations Officer, EDMO B.

Through the widespread adoption of the *#AccraFloods hashtag*, EDMO B were able to harness the power of social media and use it as a valuable tool in disseminating vital information during the floods. The unified usage of the hashtag served as a rallying point for the community, fostering a sense of solidarity and shared responsibility in dealing with the aftermath of the floods. In the case of EDMO A, they utilized Facebook to provide information on the potential floods and the level of severity as indicated below,

> *"To minimize loss of lives and properties we started sharing valuable information like rainfall forecasts, hazard maps and guidelines on our Facebook page urging people to take necessary precautions. The hazard maps shared on the Facebook page played a significant role in enhancing public awareness of flood-prone areas and vulnerable zones. These maps effectively visualized the areas at high risk of flooding, enabling residents to identify their own locations within the risk zones. With this knowledge, individuals were able to make informed decisions regarding the need for evacuation and taking appropriate precautions, such as securing belongings, reinforcing structures, or relocating to safer areas."* Communications Assistant, EDMO A.

The use of Facebook by EDMO A proved instrumental in raising awareness in the mitigation phase and encouraging proactive measures among the public. By sharing valuable information on Facebook, including rainfall forecasts, hazard maps, and guidelines, they effectively empowered individuals and communities to take appropriate actions to minimize the potential loss of lives and properties during the floods.

One of the essential tasks during emergencies and disasters is enhancing the general public's situational awareness, which is a significant concern for the EDMOs. Effective communication plays a crucial role in raising situational awareness and facilitating the exchange of vital information among relevant stakeholders. To achieve this, the EDMOs employed social media platforms to disseminate alerts and other pertinent information, aiming to heighten situational awareness and foster preparedness for potential disasters. For instance, EDMO C heavily relied on social media to inform and educate the general public about the COVID-19 pandemic in Ghana even before the country reported its first case as noted from an officer below,

> *"Prior to Ghana's first recorded case of COVID-19, we took advantage of social media to disseminate information and educate the general public about the pandemic. Facebook and Twitter played significant roles in raising awareness, providing insights, and ensuring that accurate information about COVID-19 reached everyone. Through these platforms, we dedicated efforts to educate the population on the emerging virus, its symptoms, preventive measures, and the importance of adhering to public health guidelines."* Health Communications Officer, EDMO C.

By leveraging the wide reach and accessibility of social media, EDMO C effectively contributed to empowering Ghanaians with vital knowledge to combat the pandemic effectively. A second officer in EDMO C added that through social media campaigns, they played a key role in increasing awareness among Ghanaians about the novel coronavirus, its

potential risks, and the importance of preventive measures. By sharing informative graphics, videos, and written content, they effectively conveyed complex concepts in a digestible format, ensuring that the general public could easily understand the gravity of the situation. Moreover, by utilizing social media as an educational platform, they were able to reach a diverse range of audiences, including those in remote areas with limited access to traditional forms of media. The decision to utilize social media for educational purposes demonstrated EDMO C's understanding of the social media landscape and its ability to influence public opinion. Recognizing the rapid spread of misinformation and rumours surrounding the pandemic, they adopted a proactive approach to combatting the infodemic. By actively engaging with social media users, EDMO C not only provided reliable information but also encouraged a sense of community participation in addressing the crisis.

EDMO A recognized the significant benefits of sharing flood preparation information on social media for raising awareness and assisting the general public in taking essential precautions. By leveraging social media platforms, EDMO A effectively disseminated essential information on the Accra floods on Facebook and X (Twitter) to promote flood preparedness among the broader community. An officer from EDMO A retorted,

> *"...Facebook and Twitter served as valuable platforms for engaging with the public regarding flood preparedness and empowering individuals to take proactive measures in anticipation of the Accra floods. Our consistent utilization of the designated hashtag, #AccraFloods, played a pivotal role in organizing and disseminating flood-related information, thereby facilitating easy accessibility for the public. The hashtags allowed us to navigate the vast volume of social media posts, ensuring that accurate information reached those actively seeking updates on the Accra floods. Tagging locations also helped us a lot by enabling us to deliver targeted information specifically to the areas that were anticipated to be impacted by the floods."* Communications Assistant, EDMO A.

EDMO A's strategic implementation of hashtags and geolocation tags proved to be effective methods for disseminating information on social media. The utilization of the hashtag *#AccraFloods,* generally used by EDMOs A and B, played a crucial role in sorting through the abundance of social media posts, ensuring that individuals seeking updates on the Accra floods could access relevant and accurate information. Simultaneously, the use of geolocation tags further enhanced the dissemination process by delivering location-specific content, effectively tailoring the information to areas expected to be impacted by the floods. These approaches facilitated targeted and precise communication, enabling EDMO A to reach the intended audience and provide them with the information they needed to stay informed and prepared. Similarly, an officer from EDMO B highlighted the organization's use of social media platforms to disseminate flood preparedness tips. He stated,

> *"We pulled on the power of social media platforms such as Facebook, Twitter, and Instagram to share flood preparedness tips, safety guidelines, and updates on weather conditions. Our posts included links to our website with comprehensive information, including evacuation routes and emergency contact numbers."* Operations Officer, EDMO B.

One of the primary objectives during the floods was to promptly offer aid to protect lives and uplift the spirits of impacted communities. The central focus during this stage entailed providing emergency support such as administering first aid, distributing food, water, and clothing, conducting search and rescue operations, as well as facilitating the evacuation of affected individuals. Social media played a key role in providing immediate assistance to save lives and support the morale of affected communities. Social media platforms became vital channels for disseminating information, organizing relief efforts, and connecting with those in need. Furthermore, during the floods, the EDMOs effectively leveraged social media platforms to provide timely updates, ensuring that the affected communities received immediate and relevant information. Each of the five EDMOs actively shared various forms of information, as described by the officers. This approach proved vital in keeping the affected communities well-informed about the evolving situation and enabling them to take necessary precautions. By posting regular updates, the EDMOs demonstrated their commitment to proactive communication, instilling a sense of confidence among the population.

Throughout the response to the COVID-19 pandemic, social media became extensively incorporated into health interventions, serving multiple purposes such as disseminating health information to the public, guiding individuals towards relevant health resources, facilitating interaction with the public, and encouraging health-promoting behaviours. An officer from EDMO C stated,

> *"...one good thing about Facebook is its power for delivery of vital COVID-related information to the public. The platform allowed us to share information on the virus, its preventive measures, symptoms to watch for, and guidelines for safety and hygiene. This rapid dissemination of information helped to keep the public informed and educated about the COVID situation in Ghana."* Health Communications Officer, EDMO C.

The incorporation of social media into health interventions during the COVID-19 response and in addressing flood-related challenges showcased its profound impact during disasters. Its capacity to swiftly disseminate information, guide individuals to relevant resources, facilitate interactive communication, and drive behavioural changes made it an indispensable tool in navigating the complex landscapes of the COVID-19 pandemic and the Accra floods.

During recovery from the disasters, social media emerged as a key player, serving various purposes as utilized by the EDMOs. One key function of social media was to facilitate *social*

mobilization. It provided a platform for organizing and rallying communities towards collective action. The EMDOs harnessed the reach and influence of social media platforms to mobilize volunteers, coordinate relief efforts, and engage individuals in rebuilding initiatives. Similarly, social media platforms offered a platform for *sharing inspiring success stories*, highlighting the strides made in the recovery process, and motivating others to join the efforts. By showcasing the positive outcomes resulting from collective endeavours, these platforms motivated individuals to actively participate and contribute to the ongoing recovery activities. The shared stories and accomplishments created a profound sense of empowerment and unity, nurturing a collective vision of rebuilding and resilience among the affected communities. This sentiment was echoed by an officer from EDMO D. The officer emphasized the significance of this collective vision, highlighting how it instilled a renewed sense of hope and resilience among the public. Moreover, social media acted as a virtual gathering place, where EDMOs and community members could connect, engage, and offer support to one another. It provided a forum for sharing ideas, resources, and practical advice, nurturing a collaborative spirit that was essential for the recovery efforts. The officer from EDMO D acknowledged the role of social media in promoting unity and encouraging community members to actively participate in the recovery activities, amplifying the collective impact of their endeavours. Table 6.10 provides a summary of diverse strategies employed by the EDMOs in disseminating information, offering a valuable reference resource from which the EDMOs can learn from their own practices.

Table 6.10 Social Media Disaster Information Dissemination Strategies

Information Dissemination Strategy	Description
Hashtag Usage	EDMOs, particularly EDMO B, effectively utilized hashtags such as *#AccraFloods* to raise awareness and disseminate real-time updates during the floods. Hashtags served as a unifying element for the community and facilitated easy information access.
Safety Guidelines	EDMO A and B leveraged platforms like Facebook, X (Twitter), and Instagram to share flood preparedness tips, safety guidelines, and weather updates. EDMO C used Facebook and X (Twitter) to disseminate information about the COVID-19 pandemic, ensuring broad public awareness.
Geolocation Tags	EDMO A strategically employed geolocation tags to deliver targeted flood-related information to specific areas anticipated to be affected. This approach facilitated efficient information delivery.
Timely Updates	All EDMOs consistently shared timely updates on social media platforms during the Accra floods and the COVID-19 pandemic. This

	proactive communication played a crucial role in keeping the public informed and fostering confidence.
Multimedia Content	EDMO D emphasized the significance of using various formats like text, images, and videos on social media. This approach enhanced engagement, making information more accessible and engaging for a diverse audience during the floods.
Interaction and Engagement	EDMO D highlighted active engagement during the floods, allowing affected communities to ask questions and receive prompt responses, creating a supportive environment.
Directing to Health Resources	EDMO C used social media platforms to direct individuals to important health resources during the COVID-19 pandemic. Links to official websites, helpline numbers, testing centres, and vaccination sites were shared to enable easy access to necessary services.
Motivating Health Behaviours	Social media played a pivotal role in motivating health behaviours, with campaigns launched by EDMO C to promote practices such as wearing masks, physical distancing, and getting vaccinated during the COVID-19 response.
Social Mobilization	EDMO A harnessed social media in the recovery period to mobilize volunteers, coordinate relief efforts, and engage communities in rebuilding initiatives. The nature of social media amplified the impact of these efforts.
Showcasing Success Stories	EDMO D utilized social media to share inspiring success stories, showcasing positive outcomes resulting from collective recovery efforts. This served to motivate individuals, fostering a sense of empowerment, unity, and resilience among affected communities.
Addressing Critical Issues	EDMO C used social media to address critical issues such as shortages of medical equipment during the COVID-19 pandemic. By sharing real-life impact stories, they mobilized public support, creating awareness and driving action to mitigate the identified challenges.

The information dissemination strategies employed by the EDMOs during the Accra floods and the COVID-19 pandemic exhibited both commonalities and differences. In both scenarios, social media platforms played a key role, with the EDMOs utilizing platforms like Facebook, Twitter, and Instagram to share timely updates and engage with the public. While motivating health behaviours and directing individuals to health resources were prominent during the COVID-19 pandemic, these strategies were not explicitly relevant to the flood response. Social mobilization through platforms like Facebook and Twitter played a crucial role during the recovery phase of both emergencies, with the EDMOs rallying communities, organizing volunteer efforts, and showcasing positive outcomes. This underscores the adaptability of the EDMOs in tailoring their communication approaches to the unique challenges posed by different emergencies while recognizing the consistent reliance on social media platforms for effective information dissemination.

The findings of this study bring valuable insights to the realm of social media communication in emergency and disaster management. The STREMII model, especially the third construct, underscores the importance of taking appropriate measures to contain and address crisis situations. However, it leaves a gap by not explicitly outlining the specific steps and strategies to be employed in the process. This research serves as a significant contribution by bridging this gap, offering a detailed exploration of the social media information dissemination strategies adopted by the EDMOs. It goes beyond the theoretical framework to unravel the practical steps taken by these organizations during the Accra floods and the COVID-19 pandemic. By shedding more light, this study provides an understanding of the actionable steps that can be undertaken in leveraging social media for effective communication during emergencies and disasters. In doing so, it not only complements the theoretical foundations laid out by the STREMII model but also offers a practical guide for emergency and disaster responders looking to enhance their social media communication strategies.

6.7 Monitoring and Evaluation

The fourth data analysis theme revolves around *monitoring and evaluation*, which entails staying informed about emerging online narratives on the responses made on the crises and conducting evaluations accordingly. Thus, assessments are made to see whether the information provided is accurate and timely, and whether the response measures are addressing the needs of the affected community.

The EDMOs revealed that information disseminated by them had impacted the perception of the public. The term *information impact* in this context pertains to the influence or effects of the information disseminated by the EDMOs on social media platforms during disasters. It encompasses an evaluation of how the shared information influenced public perception, shaped responses, and contributed to overall management efforts during the Accra floods and COVID-19. By examining the reach, engagement, and the resulting actions triggered by the information, a holistic understanding of the information's impact on social media can be obtained. An officer from EDMO B asserted,

> *"When information on the flood was shared on both Facebook and Twitter, it significantly impacted public perception about the flood. For instance, by sharing real-time updates on flood warnings, severity, and affected areas, these platforms helped raise awareness among the public about the situation's seriousness. Also, by providing visual evidence such as photos and videos, they enabled individuals to witness the extent of flooding, further influencing their perception of the event."* Public Relations Officer, EDMO B.

An officer from EDMO A concurred by stating,

> *"The posting of flood information on social media was key in shaping preparedness and response behaviours. In the course of the flood, we timely shared critical information such as providing guidance on evacuation routes, emergency shelter locations, and safety measures to follow during the floods which helped individuals and communities understand the risks and take necessary precautions...*" Operations Assistant, EDMO A.

During the data collection process, one of the inquiries involved how the EDMOs evaluated the efficacy of flood information disseminated on social media platforms. Shedding light on this aspect, an officer from EDMO B detailed the approach adopted by their organization. The officer explained that the evaluation process involved an analysis of the engagement metrics associated with their social media posts. Beyond merely gauging the quantitative metrics such as the number of shares, likes, comments, and views, EDMO B delved deeper into the qualitative aspects of these interactions. Understanding the level of engagement on social media posts provided valuable insights into the reach and resonance of the disseminated flood information. However, the officer emphasized that the assessment did not conclude with online interactions alone. To gauge the real-world impact of the information shared on social media, EDMO B tracked subsequent actions taken by individuals. This involved monitoring tangible outcomes, such as the initiation of evacuation measures, the adoption of safety precautions, and active participation in flood relief efforts by the community. By correlating the online engagement metrics with these tangible actions, EDMO B gained a better understanding of the effectiveness of their social media communication strategy. The officer highlighted that this approach allowed the organization to go beyond surface-level metrics and assess the practical influence of their information dissemination efforts on public behaviour during flood events.

The significance of flood information shared on social media was evident in its impact. It demonstrated the ability to swiftly reach a wide audience, increasing awareness about the flood situation and encouraging preparedness. A similar impact was observed during the COVID-19 pandemic, as confirmed by an officer from EDMO C.

> *"...by providing updates on the virus transmission, preventive measures, and vaccination campaigns through social media, it helped raise awareness among the public about the severity of the pandemic and change in their behaviours. One notable outcome was the widespread adoption of mask-wearing, as individuals became more conscious of the importance of protecting themselves and others from the virus. Social media platforms facilitated the sharing of information, resources, and personal experiences related to mask usage, leading to a collective shift in behaviour. Moreover, our emphasis on good hygiene practices, such as frequent handwashing and sanitizing, gained significant traction on social media. Educational content, demonstrations, and reminders regarding proper hand hygiene techniques were widely shared, leading to improved personal hygiene practices among individuals."* Research and Health Policer Officer, EDMO C.

The impact of information dissemination during the COVID-19 pandemic and the floods, as observed through the practices of EDMOs A, B, and C, revealed notable similarities and

differences. In both crises, the dissemination of information through social media platforms played a key role in raising public awareness and influencing behavioural changes. Officers from EDMOs B and A emphasized the importance of providing real-time updates and guidance on evacuation routes during floods, shaping preparedness and response behaviours. Similarly, EDMO C highlighted the impact of information on COVID-19 transmission, preventive measures, and vaccination campaigns, leading to widespread adoption of mask-wearing and improved hygiene practices. Engagement metrics on social media were crucial for both EDMO B and C in evaluating the effectiveness of their information dissemination efforts, emphasizing the need to analyse both quantitative metrics and qualitative aspects. Despite differences in the nature of crises and the content shared, the overarching theme was the transformative power of accurate and timely information in shaping community responses during emergencies, showcasing the adaptability of the EDMOs in leveraging social media for effective communication.

Thus, it can be affirmed that the impact of this information dissemination on social media was twofold: it raised public awareness about the severity of the crises and motivated individuals to adopt crucial preventive measures. This assertion aligns with research findings that emphasize the substantial impact of disseminated information on social media platforms. Studies, such as the work of Civelek, Cemberci, and Eralp (2016), explain how information shared on social media moulds public opinion, aiding individuals in comprehending the risks they face and guiding them on necessary measures during emergencies. Furthermore, acknowledging the psychological impact of such information is crucial. In times of crises, individuals often grapple with anxiety, fear, and uncertainty. Accurate and easily accessible information serves as a remedy by offering a sense of control and understanding, as noted by Brenda (2020), becoming a lifeline of guidance that empowers individuals to make informed decisions during emergencies, as emphasized by Nayomi, Tan, and Ashantha (2020).

6.8 Interacting with Affected Population

The fifth theme for data analysis revolves around the concept of *interacting with affected population* on social media. In the process of sharing and monitoring information, it is absolutely vital to actively engage with the affected community. This means not just passively disseminating data, but actively seeking feedback, answering questions, and addressing concerns. By fostering two-way communication, the EDMOs can establish a deeper connection with the public, ensuring that their insights are effectively understood and applied. This

interaction helps build trust, encourages collaboration, and enhances the overall impact of information shared on social media during disasters. This section is sub-divided into two sections which are *dialogic communication* and *ethical considerations.*

6.8.1 Dialogic Communication

Dialogic communication is a communication style that fosters a respectful environment where individuals are motivated to listen attentively, while also creating an atmosphere that encourages others to actively participate and express their thoughts (Huisman et al., 2019). In other words, it refers to a two-way exchange of information, where participants engage in open and collaborative dialogue. It emphasizes active listening, mutual understanding, and respectful interaction where both parties contribute their perspectives, share information, and engage in a meaningful conversation to reach a common understanding. By adopting dialogic communication on social media during disaster events, the EDMOs can establish a more effective and inclusive communication process to promote a collective response to the challenges posed by disasters.

When questioned about their methods of actively engaging with the public and fostering meaningful conversations on social media during the Accra floods, an officer from EDMO E underscored the vital role played by Facebook in their communication approach. According to the officer, Facebook emerged as an essential platform that facilitated the swift dissemination of real-time updates and safety information directly to the affected communities. Concurrently, Facebook served as a space where individuals were not only encouraged but actively participated in posing inquiries, seeking assistance, and sharing their first-hand experiences during the floods. The officer emphasized that this interactive engagement on Facebook allowed the organization to listen attentively to the concerns and questions voiced by the public. More significantly, it enabled EDMO E to respond promptly and personally to each inquiry and comment. This open and responsive exchange of information, characterized by a mutual flow of questions and feedback, not only nurtured a tangible sense of community but also actively encouraged the public to play a central role in managing the challenges posed by the floods. The officer emphasized that this approach, grounded in open communication and active involvement, significantly strengthened the connection between EDMO E and the public, fostering a collaborative effort in addressing the impacts of the Accra floods. An officer from EDMO B added,

> *"Besides, social media interactive nature allowed us to engage in meaningful two-way conversations. By providing avenues for further inquiries, we created avenues where the public*

> *could actively participate in responding to the floods. This encouraged collaboration among the affected population, as they felt heard and involved in the decision-making process."* Research and ICT Officer, EDMO B.

Social media proved instrumental in facilitating dialogic communication during the floods. It enabled the EDMOs to share information effectively, respond to inquiries promptly, and foster a sense of community participation. By leveraging this platform, the EDMOs were able to harness the collective strength of the public, ultimately enhancing their ability to manage the floods and support those affected. Additional response was solicited from an officer in EDMO A who said,

> *"... social media served as a hub for information sharing not only from our end but also from the public as well. We requested people to share their experiences and provide updates from their respective areas to know what support they required. This created a supportive platform for sharing information and collaborating on solutions. This level of engagement helped to build trust, as individuals felt that their needs were being addressed."* Head of Communications, EDMO A.

An officer from EDMO C highlighted the significant role of dialogic communication in fostering trust and promoting shared responsibility during the COVID-19 pandemic. A notable demonstration of this was the effective utilization of platforms like Facebook and X (Twitter) to address vaccine hesitancy. This approach involved actively engaging with the public, listening to their concerns, and providing accurate information to dispel misconceptions. The use of these principles exemplifies how dialogic communication can be instrumental in building trust and encouraging responsible actions, particularly in the context of vaccine hesitancy during the pandemic.

> *"...open and honest communication, coupled with a genuine concern for public well-being, can go a long way in building trust and promoting a sense of shared responsibility. One example is when we used Facebook and Twitter to address vaccine hesitancy. We listened to concerns expressed by people and responded with factual information, addressing misconceptions and providing evidence-based answers. We also organized live Q and A sessions a couple of times, allowing the public to ask questions directly. This approach fostered trust, increased vaccine acceptance, and encouraged more individuals to get vaccinated, contributing to the overall public health response."* Advocacy and Social Mobilization, EDMO C.

The example set by EDMO C underscores the importance of open and honest communication, coupled with a genuine concern for public well-being. By actively addressing vaccine hesitancy through social media platforms, they not only engaged with the public but also leveraged the power of technology to reach a wider audience. This approach demonstrates the potential of dialogic communication in building trust, promoting responsible actions, and ultimately contributing to a more effective public health response during challenging times like the COVID-19 pandemic.

Existing research aligns with the findings presented in this study, reinforcing the positive impact of dialogic communication, particularly in the context of disaster management. The literature concurs that dialogic communication goes beyond mere information dissemination; it serves as a multifaceted tool that can foster a range of positive outcomes (Hinson, Osabutey & Kosiba, 2020). This aligns with the idea that, during disaster events, open and responsive communication on social media platforms allows the EDMOs to share information and actively connect with and address the concerns of the affected public. Furthermore, the literature emphasizes the role of dialogic communication in building relationships. Chen et al. (2023) posit that interactive communication fosters a sense of connection between organizations and their stakeholders. In the context of the EDMOs, the approach of using Facebook as a space for individuals to pose inquiries, seek assistance, and share experiences exemplifies the establishment of a relational dynamic. This ongoing interaction builds trust and strengthens the relationship between the organization and the community it serves, essential components for effective disaster response and community resilience (Cohen, et al., 2017). Moreover, the literature suggests that dialogic communication plays a pivotal role in promoting civic engagement. By actively involving the public in the communication process, the EDMOs encourage community members to participate in decision-making, share information, and contribute to the overall disaster response efforts (Bebbington et al., 2007).

6.8.2 Ethical Considerations

Effective social media communication during disasters plays a critical role in safeguarding public safety and facilitating coordinated emergency response. It enables the dissemination and gathering of vital information, issuance of warnings, and provision of instructions to individuals affected by the disaster. However, the realm of disaster communication on social media presents a range of ethical challenges. This section delves into how the EDMOs addressed ethical concerns when communicating with the public during disasters. We analysed the EDMOs' sensitivity to ethics issues to determine how well it reflects ethical principles identified in our review of literature, particularly Makela (2015) and Townsend and Wallace (2016) and are elaborated upon below.

- *Privacy and Anonymity:* This entails handling personal information with utmost care and respect of privacy rights. During disasters caution must be taken when sharing sensitive details about affected individuals and ensure that privacy is maintained while still providing necessary information for public safety. Anonymity plays a critical role in maintaining privacy, especially when sharing sensitive information during a disaster.

It involves concealing or protecting the identity of individuals whose data is being used. In many cases, anonymizing data means removing any personally identifiable information, such as names or addresses, before it is shared or analysed.

- *Informed Consent:* This involves upholding privacy rights, which means that individuals have the right to know and understand how their personal information will be used, especially in situations where sensitive data might be involved. In the context of disasters, obtaining informed consent might involve explaining to affected individuals why and how their data is being collected and used. It ensures that individuals have a choice in whether they want to share their information and under what conditions.
- *Confidentiality:* Confidentiality is the principle of keeping sensitive information secure and restricted to authorized individuals or organizations. In a disaster scenario, maintaining confidentiality is vital, especially for personal medical records or other private data. Emergency and disaster organizations should have strict protocols in place to safeguard this information from unauthorized access.

The analysis of documents reveals that among the EDMOs under study, only EDMOs C and E had established explicit ethical guidelines as an integral part of their operational framework. These ethical guidelines served as a set of principles and standards that governed their conduct and decision-making processes which also include accessing and sharing private data. Of the three key variables utilized to assess ethics-related matters, it is notable that EDMOs C and E adhered to the principles of privacy and anonymity, reinforcing their commitment to safeguarding these critical aspects of ethical practice. An officer from EDMO C recounted,

> *"...of course, sensitive information was handled with utmost care. We only shared necessary details without names and place of residence, ensuring that personal information is not disclosed in a way that could lead to stigmatization."* Health Communications Officer, EDMO C.

By adhering to the principles of privacy and anonymity, EDMOs C and E not only demonstrated ethical responsibility but also reinforced the integrity of their operations. Their commitment to these ethical values had the potentials for building trust among the communities they served, fostering a culture of responsible information handling during emergency and disaster situations. An officer from EDMO E added.

> *"Our responsibilities require us to protect the identities of individuals due to security reasons. I am sure you are familiar* [referring to the researcher] *with the whistleblowing act, all of which emphasize our duty as a security agency to safeguard the names and features of citizens involved in our operations."* Officer in the Intelligence Directorate.

The two EDMOs effectively implemented the principles of privacy and anonymity in their day-to-day operations. Another notable example of this was observed during the COVID-19

lockdown. An instance from EDMO E's activities on Facebook exemplifies their commitment to safeguarding privacy and anonymity. In this instance, a post depicted two individuals suspected of being involved in a criminal act, but their names were intentionally omitted, and their faces were obscured. By withholding their identities and concealing their faces, EDMO E ensured that the suspects remained anonymous. This practice served to protect their privacy, as well as prevent any premature judgments or potential stigmatization associated with their involvement in the investigation. In the context of EDMO C's operations, a similar dedication to preserving privacy and anonymity was evident. This commitment was exemplified through their social media presence on Facebook and X (Twitter). Specifically, when sharing information about the daily figures of COVID-19 infection rates, EDMO C took great care not to disclose any personal information, such as the names of infected individuals or the organizations. On Facebook, their posts provided comprehensive statistics on the COVID-19 infection rates, which were essential for public awareness and safety. However, they carefully refrained from mentioning any specific names or disclosing the affiliations of the infected individuals. This meticulous approach ensured that the privacy of those affected was upheld, preventing any inadvertent disclosure of sensitive personal information. Similarly, on X (Twitter), EDMO C's updates regarding COVID-19 infection rates followed the same ethical guidelines. Their tweets maintained a focus on the statistical aspects of the pandemic, consistently omitting any identifying details or affiliations related to the infected persons. This approach was in line with EDMO C's commitment to protecting the privacy of individuals affected by COVID-19 and maintaining a responsible and ethical approach to information sharing during the pandemic.

Throughout the data gathering process, some observations were made concerning EDMO E and EDMO C regarding their approach to ethical guidelines and accountability mechanisms. One striking observation was that EDMO E appeared to be less open regarding their ethical guidelines. Transparency is another fundamental aspect of ethical data management, as it builds trust and ensures that individuals affected by data operations are informed. The lack of transparency in disclosing how data is collected, stored, and used can raise concerns about data privacy and the ethical practices within EDMO E. Conversely, while EDMO C had ethical guidelines in place, some respondents within the organization were not fully aware of these guidelines. This raises concerns about the effectiveness of communication within the organization. It is necessary for all members of an EDMO to be well-informed about the ethical principles guiding their work to ensure consistent compliance and understanding. Another key

observation was that neither EDMO E nor EDMO C appeared to have established clear mechanisms for accountability, including consequences for unethical behaviour. Accountability mechanisms are vital to ensure that ethical standards are not merely symbolic but actively enforced. The absence of such mechanisms can potentially lead to ethical breaches going unaddressed.

While it was evident that EDMOs C and E had included elements of *informed consent* and *confidentiality* standards within their ethical guidelines, it is important to acknowledge that this research faced certain limitations, namely the inability to verify the practical implementation of these standards. Despite the respondents' mention of the implementation of these guidelines, the research scope posed constraints that made it challenging to conduct a thorough examination. *Informed consent* and *confidentiality* are vital aspects of ethical practice, particularly where sensitive information is involved. However, their implementation often requires detailed scrutiny, which the research could not achieve within its defined parameters. The verification of *informed consent* and *confidentiality* standards typically demands access to specific cases, extensive documentation, and potentially, direct observation of operational practices. The complexity and sensitivity of these matters can pose challenges in confirming their practical application, especially when the research scope is limited in terms of resources, access, and time. While we acknowledge the presence of these ethical elements in the guidelines and the respondents' statements about their implementation, the validation of these standards would ideally require a more in-depth research effort, which, unfortunately, was not within the scope of the capacity of this research.

6.9 Supporting Technologies

The EDMOs play a critical role in responding to and mitigating the impact of various emergencies and disasters. To effectively carry out their mission, the EDMOs gather and analyse information to gain insight into the current state of events and formulate appropriate response plans. While social media has become an invaluable tool for this purpose, it has its limitations, especially during disruptions like unstable power or low bandwidth, as discussed in Chapter 7. In acknowledgment of these challenges, the EDMOs have taken proactive steps to enhance their information collection and dissemination efforts. They have recognized that relying solely on mainstream social media platforms like Facebook, X (Twitter), and YouTube is not sufficient, especially when these platforms may become inaccessible or unreliable during emergencies. Therefore, they have diversified their sources and methods of information

gathering by incorporating non-traditional social media platforms into their management practices. An operations officer at EDMO D shared their experience in this regard.

> *"... in the Accra floods, we took every possible measure to ensure that we were fully prepared to receive distress calls from all sources. One way we accomplished this was by utilizing our website to receive emails and text messages. This enabled us to provide assistance to survivors and also allowed the public to share information and provide feedback on our emergency response efforts."* —Operations Officer, EDMO D.

Another operations officer from EDMO D added,

> *"...our team implemented comprehensive measures to ensure no aspect was overlooked. We took proactive steps to establish channels for receiving distress calls from all angles, leaving no stone unturned. One notable strategy we employed was leveraging our website to receive emails and text messages, expanding the avenues through which we could extend assistance to survivors."* Operations Officer, EDMO D.

The EDMO's implementation of websites for information gathering and public engagement during the emergency situation showed great promise. This approach not only provided a means for survivors to seek help, but it also encouraged active participation from the general public in the relief efforts. By promoting the sharing of information, expressing concerns, and soliciting thoughts, the EDMOs fostered an environment that was inclusive and collaborative. The utilization of emails could play a crucial role in facilitating swift and efficient communication. These channels could prove invaluable, especially when social media platforms might be unavailable due to breakdowns caused by the disasters. Survivors and affected individuals could rely on these channels to urgently request aid, ensuring that their distress calls received prompt attention and assistance. Additionally, by giving the public an opportunity to contribute information and provide feedback, the EDMOs created a valuable mechanism for capturing insights from various perspectives. This collective knowledge could greatly enhance their overall disaster management efforts and enable them to make real-time improvements to their emergency management efforts.

Another popular supporting technology used by the EDMOs, particularly for information dissemination, is the Short Message Service (SMS). This approach was implemented in collaboration with mobile network operators, proving to be effective and valuable. The use of SMS had empowered the EDMOs to rapidly and efficiently deliver vital information to affected communities, even in situations where internet connectivity and other communication channels had become disrupted. This technique, predominantly employed by EDMO B, serves as an exemplary model that could be emulated by other EDMOs. The addition of SMS to the main social media platforms, in combination with the capabilities of mobile phones to send and receive texts, has significantly enhanced information dissemination efforts. SMS is resilient

and can function even in challenging conditions (FEMA, 2014). A study conducted by GSMA (2017) found that SMS was a reliable communication service during crises and disasters and this is because it is less susceptible to network congestion and can operate on lower bandwidth, making it a go-to solution when other communication channels are disrupted due to high demand or technical issues.

In the peak of the COVID-19 pandemic, EDMO C effectively implemented the GH COVID-19 Tracker App, a downloadable software, in addition to social media to collect data pertaining to infected individuals. The App utilized telephone-related data to track the movements of infected individuals, providing information into their recent movements and potential exposure to the virus. The implementation of the GH COVID-19 Tracker App by EDMO C offered significant advantages in managing the spread of COVID-19. The primary objective of the App was to support contact tracing, a vital strategy for identifying and monitoring individuals who had been in close contact with confirmed COVID-19 cases.

The EDMOs implemented a multi-channel strategy to ensure the broad dissemination of information. This approach enables them to engage with the public on a larger scale, promoting informed decision-making and strengthening community resilience during disasters. Despite the rise of social media, the importance of traditional mass media remains evident, particularly in situations where disruptions occur within social media platforms. An officer in EDMO A revealed,

> *"... while we recognize that reaching a wide audience may present challenges compared to social media platforms, we have contingency plans in place. These include utilizing outlets such as television and radio to ensure the dissemination of information on a larger scale. By employing multiple channels, we aim to effectively reach and inform as many individuals as possible, even in situations where social media may not be accessible or reliable."* Operations Assistant, EDMO A.

Emails and phone calls remain reliable communication methods, even when social media is unavailable. An email system can be utilized to send updates, announcements, and important information to stakeholders. It allows for asynchronous one-to-one or group communication and file attachments can be sent to reach a large number of recipients. Phone calls on the other hand can serve as a reliable means of communication when social media platforms are down. Stakeholders can be reached directly through voice calls, providing real-time updates and addressing any concerns or queries. It is worth noting that within the EDMOs, emails and phone calls were employed for internal communication among their teams, as elucidated by an officer from EDMO C.

> *"In addition to using social media for information sharing during disaster operations, we use emails to share situation reports, action plans, and logistical details with our team members which eases coordination within our team."* Research and Health Policy Officer, EDMO C.

In addition to phone calls, EDMOs A, B, and E recognized the importance of radio communication devices as an essential component of their communication strategy. Radios, visibly held by some of the participants during data collection in the form of *walkie-talkies,* serves as a valuable redundancy to other communication methods, such as mobile phones or social media. In cases where these primary communication channels fail, radios act as a reliable backup, helping ensure continuity of information flow. Shedding more light, an officer from EDMO A emphasized the significance of utilizing phone calls and radios as alternative means of communication during instances where social media platforms may be temporarily unavailable or facing disruptions. This approach ensures that vital information can still be exchanged promptly and efficiently. By leveraging these technologies, the EDMOs were able to maintain seamless communication channels, enabling quick decision-making and immediate updates, even in the face of social media challenges. This strategy plays a pivotal role in upholding effective coordination and rapid response within the EDMOs, ultimately contributing to their overall operational resilience.

The analysis of documents obtained from the EDMOs revealed that they employed impressive technologies in their disaster management efforts. These advanced technologies were utilized during the COVID-19 pandemic to track, comprehend, and monitor COVID-19 cases. Several measures and tools were implemented, including dashboards and drones. The dashboard served as a platform to present information and visualize the trends of COVID-19 in Ghana. For example, EDMO C's *"COVID-19 Situation Dashboard"* consisted of four sections. The first section provided a breakdown of confirmed cases by region. The second section presented aggregated data on confirmed cases, recoveries, and deaths. The third section displayed the spatial distribution of confirmed cases, indicating the intensity of the outbreak in each region. The fourth section provided information on COVID-19 categorized by gender distribution. EDMO A on the other hand utilized drone technology and its remote sensing capabilities in situations where limited human interactions were necessary as part of their COVID-19 response measures. In their post-COVID report, EDMO A indicated they employed a drone for disinfection exercises at public places and institutions and for the swift transportation of essential items, personal protective equipment, and COVID-19 samples to testing centres. The claim of using drones for disinfection exercise could not be supported by any empirical evidence by the EDMOs and searching for such evidence through the media landscape proved

futile. However, there was evidence to support that the drones were repurposed to transport essential medical supplies to remote and hard-to-reach areas as reported in the media:

> *"...about 79,800 medical products have been delivered to health care centers in remote areas across the country using drones..."* myjoyonline.com report, August 19, 2020.

Indeed, drones have proven to be versatile and invaluable tools for various purposes, including aerial surveillance, search-and-rescue missions, and damage assessment, which can greatly benefit the EDMOs (Mastura, 2022).

The fact that none of the EDMOs utilized a Geographic Information System (GIS) and the Internet of Medical Things (IoMT) is unexpected, as these technologies offer valuable capabilities that can greatly enhance their emergency response and disaster management efforts. A GIS enables the collection, storage, analysis, and visualization of geographic data, making it a powerful tool for mapping and spatial analysis. The EDMOs can use a GIS to better understand the geographical distribution of flood hazards, vulnerable populations, and critical infrastructure (Brumarova et al., 2021). IoMT devices on the other hand can be used in health emergency cases such COVID-19 to remotely monitor the health and well-being of affected individuals, including vital signs, medication adherence, and other health parameters which can be critical in providing timely medical assistance (Hemmati, & Rahmani, 2022).

Based on the data gathered from the EDMOs and existing literature, Table 6.11 presents supporting technologies to augment social media communication during emergencies and disasters.

Table 6.11 Supporting Technologies for Social Media Communication

Supporting Technologies	Purpose
Website (e.g., COVID-19 Situation Dashboard)	Presentation of information and visualization of trends (e.g., breakdown of COVID-19 cases).
Email	Asynchronous written communication for detailed updates, reports, and coordination.
SMS	Information dissemination, especially in low-bandwidth situations.
In-house Developed Apps (e.g., GH COVID-19 Tracker App)	Mobile applications for emergency alerts, notifications, and access to critical information.
TV and FM Radio	Broadcast important updates, news, and emergency alerts to a wide audience.
Phone Communication	Voice communication for direct contact, reporting, and coordination.
Radio Communication	Reliable back up for phone communication.

Drones	Transportation of essential medical supplies, aerial surveillance for situational awareness, search-and-rescue missions, and damage assessment.
GIS*	Spatial data analysis, real-time situational awareness, and mapping for decision support.
IoMT*	Remote health monitoring

*GIS and IoMT were not used by the EDMOs in the sample.

6.10 Summary of Chapter

The chapter reflects the nature of approaches used by the EDMOs in communicating emergencies and disasters on social media by adapting the STREMII model for the data analysis. It culminated in discussing five out of the six themes which are *social listening (*information gathering strategies**,** information searching, cleaning, verification and analysis strategies, and addressing biased and misleading information), *communication target* (how the EDMOs used social media for both external and internal communication), *crisis response (*how the EDMOs disseminated information on social media), *monitoring and evaluation* (impact of disseminated information), and *interaction with affected population* (dialogic communication and ethical considerations).

The sixth theme, which is *implementing necessary changes,* will be discussed in the next chapter which highlights social media challenges faced by the EDMOs, social media resources and the EDMOs' dynamic capabilities.

CHAPTER SEVEN
SOCIAL MEDIA CHALLENGES, RESOURCES, AND CAPABILITIES OF EDMOs

7.1 Introduction

In this chapter, the findings of the last theme of data analysis are dealt with, which is *implementing necessary changes*, aligned with the sixth construct in the STREMII model (Stewart & Wilson, 2015). This phase of data analysis involved a review of the social media strategy employed by the EDMOs, building upon the processes followed in Chapter Six. The primary aim of this phase was to explore the capabilities of the EDMOs, highlighting valuable insights and recommendations to strengthen the EDMOs' effectiveness and efficiency in their operations. The focus was not only on identifying areas for improvement but also on investigating innovative strategies and tactics that could be implemented to achieve better outcomes. Thus, through analysis of the social media resources and strategies of the EDMOs, the aim was to uncover potential gaps, challenges, and untapped opportunities that could be addressed.

The RBT and DCV theories are extensively used in this phase. These theories, alongside the STREMII model, initially guided the formulation of interview questions, coding techniques, and were again used for data analysis. By adding the two theories, we aim to identify specific resources and capabilities pertaining to social media that can enhance communication during emergency and disaster situations on social media platforms. The RBT and DCV theories are employed to delve into how organizations can improve their overall performance by effectively managing and leveraging internal resources, knowledge, and capabilities (Miller, 2019).

The RBT places emphasis on the internal resources that organizations need in order to carry out specific actions and attain lasting competitive advantages. These resources include *"all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc. controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness"* (Barney, 1991, p. 101). The RBT argues that an organization's resources and capabilities, rather than its industry or market position, are the primary determinants of its performance. Applied in this research context, it is posited that EDMOs' social media performance depends on their social media resources. Three key constructs can be derived from the RBT which are *tangible resources*, *intangible resources*, and *capabilities*

(Barney, 1991; Wernerfelt, 1984; Grant, 1991). Tangible resources are those physical assets that an organization uses in order to produce its products or services. These resources can be anything from buildings and machinery to raw materials like wood or metal. Intangible resources are those that are hard to touch, see, or quantify. They include human resources, such as knowledge and skills; organizational resources, such as culture, reputation, and branding; and information resources, such as databases and intellectual property. Capabilities are the firm's ability to deploy and utilize its resources effectively. They include the skills, knowledge, systems, and processes that enable a firm to coordinate and integrate its resources to achieve desired outcomes

The DCV on the other hand focuses on the ability of organisations to *adapt*, *renew*, and *reconfigure* their resources and capabilities in response to changing conditions and evolving environments. While RBT emphasizes the importance of organization-specific resources and capabilities in achieving optimal performance, the DCV recognizes that the static possession of resources alone may not be sufficient. It argues that the ability to *dynamically* adjust and deploy resources in alignment with changing circumstances is crucial for long-term success. *Dynamic capabilities* involve three key processes (Teece, 2007a): *sensing*, *seizing* and *transforming*. *Sensing* involves perceiving and recognizing changes in the external environment, including technological advancements and public preferences. Once changes are sensed, organizations need to *seize* or capture these opportunities by rapidly and effectively mobilizing and deploying their resources and capabilities. This involves making strategic decisions, allocating resources, and implementing appropriate actions to take advantage of emerging opportunities. *Transforming* process refers to the organization's ability to modify, reconfigure, or develop new resources and capabilities in response to changes. It includes activities such as organizational learning, knowledge creation, innovation, and building new competencies. By continuously adapting and renewing their resource base, organizations can enhance their performance and sustain it over time (Teece, 2007b).

Table 7.1 displays the key focus of the data analysis in this chapter which is *implementing necessary changes*. It provides an overview of the sub-themes associated with this theme, highlighting the specific research questions it aims to address.

Table 7.1 Themes for Second Round of Data Analysis

Theme	Sub-theme	Description	Answering Research Question
Implementing Necessary Changes	Addressing Social media Challenges	Investigates the problems faced by the EDMOs using social media for communication.	1.4, 1.5
	Securing Social Media Resources	Evaluates the tangible and intangible social media resources that EDMOs require to achieve optimal communication outcomes.	
	Dynamic Capabilities	Explores EDMOs' set of skills, processes, routines, and dynamic capabilities that are regularly used in perceiving and recognizing changes in the external environment, including technological advancements and public preferences.	

7.2 Implementing Necessary Changes

The last and sixth theme of the research is *implementing necessary changes* which entails reviewing the social media strategies of the EDMOs based on the findings of the five other themes, an important step to ensure that the research comprehensively achieves its objectives. By incorporating the insights and findings from the previous themes, the social media strategy of the EDMOs can be evaluated and refined for optimal emergency response and disaster management. This is discussed under three sub-sections which are *social media challenges*, *social media resources*, and *EDMOs dynamic capabilities.*

7.2.1 Addressing Social Media Challenges

While social media can be a valuable tool for the EDMOs, they also face certain challenges in effectively utilizing these platforms. Addressing these challenges requires a proactive approach, dedicated resources, and ongoing improvement in social media management strategies for the EDMOs. By recognizing and addressing these challenges, the EDMOs can harness the potential of social media while mitigating the risks associated with its use. The challenges are highlighted in Table 7.2 and discussed further below.

Table 7.2 Social Media Challenges Encountered by the EDMOs

Social Media Challenges	Description
Information Overload	Exposed to an enormous amount of information making it challenging to process, filter, and absorb content effectively.
Misinformation	Sharing of unverified or false information amplifying fears and anxieties during emergencies and disaster.

Real-time Monitoring	Monitoring, analysing, and responding to incoming messages, comments, and inquiries in a timely manner and simultaneously on multiple platforms.
Limited Reach and Accessibility	Not offering full accessibility for individuals with visual and hearing impairments.
Platform-specific challenges	Each social media platform operates on its own set of rules, functionalities, and user expectations (e. g., Twitter's character limit necessitates concise and succinct messaging). This requires EDMOs to tailor their communication strategies to suit the unique characteristics and preferences of each platform's user base.
Low Bandwidth, Network Failure and Power Outage	Disruptions as result of a surge in communication traffic, including voice calls, text messages, and data usage leading to slow or unreliable connectivity and power failure.
Budgetary Constraints and Resource Allocations	Inadequate budgetary support and resource allocation for social media operations.

Information Overload

Information overload on social media is a prevalent and complex issue that impacts individuals, organizations, and society as a whole. It occurs when individuals are exposed to an overwhelming volume of information, making it challenging to process, filter, and absorb content effectively (Eppler & Mengis, 2004). During emergencies or disasters, social media platforms can quickly become flooded with vast amounts of information, including rumours, unverified reports, and misleading content. The EDMOs need to navigate through this overload of information to identify credible sources and ensure they are disseminating accurate and verified information to the public. An officer from EDMO B emphasized on the problem of information overload by stating,

> *"...Facebook was flooded with too much information which was necessary to filter through them, identify credible sources, and ensure that accurate information is shared promptly to mitigate confusion and panic during the floods. This was time-consuming..."* Operations Officer, EDMO B.

A post-disaster analysis document retrieved from EDMO A emphasizes the negative impact of information overload on decision-making processes. It highlights that the sheer volume of data during emergencies overwhelms officers, potentially leading to delays or errors in critical decisions. The document highlights the urgency of addressing information overload in disaster scenarios. It emphasizes that mitigating the negative impact of overwhelming data is essential for ensuring timely, informed, and effective decision-making, which is pivotal for successful disaster response and recovery efforts. Ultimately, the document serves as a call to action for enhancing information management strategies in emergency management, emphasizing the critical role of data in shaping the outcome of emergency situations.

During disasters such as floods, social media becomes inundated with an overwhelming amount of information that needed to be carefully filtered through. It was imperative for the EDMOs to sift through the vast volume of content, distinguish credible sources from unreliable ones, and ensure that accurate and verified information is promptly shared with the public. This process of information filtering is not only time-consuming but also immensely challenging. The sheer magnitude of posts, updates, photos, and videos related to the floods made it difficult to efficiently identify the most relevant and accurate information. This echoes the findings of Eppler and Mengis (2004) who established that information overload can have several negative consequences by overwhelming cognitive resources, impairing decision-making, problem-solving, and critical thinking. Similarly, Shaoxiong et al. (2020) opined that information overload can decrease productivity as excessive time is spent scrolling through social media feeds instead of focusing on tasks.

Information overload on social media is a multifaceted issue driven by various factors, including the volume, velocity, and nature of content shared on these platforms. It posed challenges for the EDMOs for substantial resources and personnel ought to be dedicated to comb through the influx of data which required a rigorous and meticulous evaluation process to prevent the dissemination of misinformation or unverified reports that could potentially exacerbate confusion and panic among the affected population.

Spread of Misinformation

Related to the problem of information overload is the spread of *misinformation* and rumours. Social media platforms are prone to the spread of misinformation and rumours, which can cause panic, confusion, and hinder effective emergency response efforts. The EDMOs must actively monitor and address false information by providing timely corrections, clarifications, and credible sources to combat the spread of misinformation. An officer from EDMO C underscored this challenge as follows,

> *"As you would agree with me misinformation and rumours about the COVID pandemic spread on social media like bush fire, leading to confusion and hindering mitigation efforts. Our organization took a proactive approach by promptly providing correct information and clarifications. We actively engage with the public to combat false information such as fake remedies and encourage them to rely on official sources for accurate updates."* Advocacy and Social Mobilization Officer, EDMO C.

The Media Foundation for West Africa (MFWA), a highly influential media organization based in Ghana, has provided further validation of the aforementioned statements regarding the negative impact of information overload on decision-making, particularly in the context of the

fight against COVID-19. MFWA's insightful reportage has shed light on how misinformation exacerbated the challenges faced during the pandemic response, offering a real-world example of this critical issue.

Misinformation and rumours on social media platforms have the potential to incite panic among the public. When unverified or false information is shared, especially during crises or emergency situations, it can amplify fear and anxiety. This is in line with the findings of research conducted in recent years (Ecker et al., 2022; Olan et al., 2022), which underscore the profound impact of misinformation and rumours on public perception, emotions, and behaviour during times of crisis and emergency. The researchers concluded that misinformation and rumours on social media platforms have the potential to incite panic among the public. When unverified or false information is shared, especially during crises or emergency situations, it can amplify fear and anxiety. These findings reveal the critical need for proactive measures to address the spread of false information on social media platforms.

Real-time Monitoring Challenges

Another challenge, as mentioned by an officer from EDMO E, has to do with *real-time monitoring* and response. Social media operates in real-time, and the EDMOs need to have the capability to monitor multiple platforms simultaneously. This requires dedicated resources and tools to effectively monitor, analyse, and respond to incoming messages, comments, and inquiries in a timely manner. One of the primary challenges in real-time monitoring is the sheer volume of information that floods social media platforms during emergencies or disaster situations. Monitoring multiple platforms simultaneously can be a daunting task, as each platform has its own distinct user base and content flow. The EDMOs need to allocate dedicated staff or teams who can actively monitor and analyse the information, ensuring that no essential updates or inquiries are missed. The officer highlighted,

> *"... we utilize about three different social media platforms and monitoring them simultaneously is a problem. Managing the monitoring process across these platforms becomes a challenge due to the volume of information and the need for prompt responses*." Communications Officer, EDMO E.

The use of multiple platforms arises from the recognition that different platforms cater to diverse user demographics and communication preferences. Each platform has its own distinct user base and content flow, requiring the EDMOs to establish a presence and engage with the public across these channels. However, monitoring multiple platforms simultaneously becomes a logistical hurdle. Firstly, monitoring multiple platforms demands considerable time and effort. Each platform requires attention to identify relevant posts, messages, comments, and

inquiries that necessitate responses or further analysis (Stefan et al., 2018). The constant influx of information on each platform can be overwhelming, making it challenging to allocate sufficient resources to monitor all platforms effectively. Secondly, handling multiple platforms simultaneously requires coordination and multitasking (Karin, 2023). Dedicated staff members or teams are often assigned to monitor and respond on each platform, ensuring that no critical updates or inquiries are overlooked. Effective communication and coordination between these teams are essential to maintain a comprehensive monitoring approach and ensure consistent messaging across platforms. Despite the challenges, the EDMOs recognize the importance of maintaining a presence on multiple social media platforms to effectively reach and engage with the public during emergencies or disasters. By harnessing dedicated resources, such as personnel and technology, the EDMOs can significantly bolster their capabilities. These resources can be allocated towards the development and maintenance of advanced monitoring tools and technologies, enabling the organizations to stay abreast of critical information in real-time. Implementing state-of-the-art monitoring tools is paramount for the EDMOs to effectively track and assess situations across various platforms. Tools such as social media analytics and geospatial mapping systems provide a holistic view of potential threats and ongoing incidents. Additionally, leveraging artificial intelligence and machine learning algorithms within these tools can enhance the organization's ability to process large volumes of data swiftly, identifying patterns and anomalies that might otherwise go unnoticed.

Limited Reach and Accessibility

Limited reach and accessibility also posed challenges when utilizing social media for disaster communication. While social media platforms have broad user bases, not everyone may have access to or actively use these platforms, especially during emergencies and disasters. The EDMOs have recognized the existence of this problem and have ensured that they had multiple communication channels in place, including traditional media outlets to reach the widest audience possible during the Accra floods and COVID-19 pandemic. Facebook and Twitter, as echoed by an officer in EDMO C, may not offer full accessibility for individuals with visual and hearing impairments. As a result, the EDMO recognized the importance of adopting inclusive communication strategies that catered to the specific needs of the affected populations. To ensure accessibility, they implemented various approaches such as providing audio descriptions of COVID protocols on FM radio stations to assist individuals with visual impairments and utilizing visual formats on TV stations to accommodate individuals with hearing impairments. These measures aimed to ensure that critical information reached all

members of the community, regardless of their accessibility challenges on social media platforms. It is important to note that the EDMOs implemented these communication strategies alongside their social media efforts, acknowledging that social media platforms still play a significant role in disseminating information to a wide range of individuals. However, by adopting additional channels like FM radio and TV stations, they extended their reach and ensured that individuals with visual and hearing impairments were not left behind or excluded from receiving critical updates and guidelines.

Furthermore, the presence of platform-specific challenges becomes evident during disasters and emergencies. Each social media platform possesses distinct features, algorithms, and user demographics, necessitating adaptability in communication strategies by the EDMOs. Understanding the intricacies of each platform and optimizing content to achieve maximum reach and engagement can be demanding in terms of time and resources. Each social media platform operates on its own set of rules, functionalities, and user expectations. For instance, X (Twitter) character limit necessitates concise and succinct messaging, while Facebook allows for more detailed updates and multimedia content. These variations required the EDMOs to tailor their communication strategies to suit the unique characteristics and preferences of each platform's user base. An officer from EDMO B recounted how platform-specific challenges impact their communication effectiveness,

> *"One of the challenges we face revolves around the functionalities of social media platforms such as Twitter and Facebook. Each platform presents different features that require careful consideration in our emergency response efforts. For instance, the character limit on Twitter necessitates concise messaging, while Facebook allows for more detailed updates. These differences are sometimes confusing..."* Public Relations, EDMO B.

This agrees with the findings of Pennycook et al. (2020) who concluded that Twitter's (X) character limits often force users to truncate their thoughts and messages, potentially sacrificing context while complex ideas or statements may be oversimplified, making it challenging to convey a complete and accurate message within the constraints. In a similar vein, Honeycutt and Herring (2009) established that character limits can result in incomplete messages or tweets that end abruptly, leaving readers with unanswered questions or incomplete thoughts which can hinder effective communication and engagement. (NB: While data analysis was on-going in 2023, X (Twitter) boosted its character limit from 280 to 4,000 characters for its blue subscribers).

The distinct functionalities of social media platforms like X (Twitter) and Facebook pose challenges in emergency response efforts. The character limit on Twitter and the ability to

provide more detailed updates on Facebook require EDMOs to carefully balance the need for concise messaging with the delivery of comprehensive information. By strategically leveraging the strengths of each platform and employing effective communication strategies, the EDMOs can overcome these challenges and ensure swift and clear messaging during emergencies and disasters.

Low Bandwidth, Network Failure and Power Outage

Low bandwidth and network failure are significant challenges during disasters, as they can hinder communication, coordination, and the timely dissemination of critical information. During a disaster, the network often becomes overloaded with a surge in communication traffic, including voice calls, text messages, and data usage. This congestion leads to slow or unreliable connectivity. Disasters like floods can physically damage network infrastructure, including cell towers, fibre optic cables, and data centres, causing network failures. An officer from EDMO A echoed this problem below.

> *"... most definitely the problem could be the frequent exchange of volumes of data. At a point in time uploading or downloading the files were very slow. I harboured suspicions that our bandwidth might be the underlying issue. Possibly, it could be attributed to the network capacity, especially considering that numerous officers were concurrently utilizing the same connection pipeline. Alternatively, it was probable that the issue stemmed from the network service provider."* Head of Communications, EDMO A.

Closely tied to the challenges of low bandwidth is the issue of network disruptions. A noteworthy incident occurred during the floods when a part of the Accra region experienced a complete network failure due to a widespread power outage as stated by an officer from EDMO E.

> *"...one of the difficulties encountered during the floods pertained to power outages, which had a widespread impact on the entire region, leading to disruptions in the network infrastructure and consequently affecting our communication in various ways*." Communications Officer, EDMO E.

The issue of network disruptions caused by power outages was not limited to the flood situations alone; it extended to other critical scenarios as well, including the challenging times of the COVID-19 pandemic. This recurring problem significantly hampered the communication processes of the EDMOs. The COVID-19 pandemic, as echoed by an officer from EDMO C, created an unprecedented demand for timely and accurate information. The EDMOs were tasked with disseminating crucial updates, guidelines, and safety measures to the public, coordinating response efforts, and ensuring that healthcare facilities and first responders had the necessary resources and support. However, the reliability of their communication infrastructure became even more critical during the pandemic. Power outages, which often

occurred unpredictably, disrupted the network infrastructure, rendering essential communication channels temporarily inoperative. This interruption had a cascading effect, affecting the ability of EDMOs to coordinate response efforts, share critical data, and provide real-time updates to the public.

The challenges of slow bandwidth, network and power failures have been an existential problem especially in developing nations like Ghana. El Khaled and Mcheick (2019) found similar challenges where low bandwidth and network failure posed critical challenges during disasters, impeding communication, coordination, and the prompt dissemination of vital information. Alberto (2019) corroborated this finding by concluding that the surge in communication traffic, encompassing voice calls, text messages, and data usage, often overwhelms the network during such events, resulting in sluggish or unreliable connectivity. Furthermore, disasters such as floods can inflict physical damage on network infrastructure, including cell towers, fibre optic cables, data centres and power lines, exacerbating the issue of network failures (UNDP, 2019).

As the flood and pandemic situation evolved rapidly, the need for uninterrupted and efficient communication became paramount. The network disruptions resulting from power outages and damage caused by the disaster added another layer of complexity to an already challenging crisis. The EDMOs had to adapt by implementing contingency plans, including utilizing supporting communication technologies as discussed in Chapter Six, to ensure that essential information continued to flow even in adverse conditions. These supportive technologies played essential roles in bridging the communication gaps and maintaining critical services.

Budgetary Constraints and Resource Allocations

Adequate resource allocation for social media operations is crucial when it comes to managing and leveraging these platforms during times of emergencies and disasters. This includes budgeting for various elements, including tools, personnel, and training, to ensure the effective and responsible use of social media during challenging situations. Unfortunately, the EDMOs faced significant challenges due to budgetary constraints. Indeed, effective disaster management often begins with real-time monitoring of social media platforms. Investing in robust monitoring tools allows the EDMOs to track developments, identify emerging trends, and swiftly respond to critical situations. However, these tools often come with subscription costs, which must be accounted for in the budget. Again, dedicated social media professionals are essential for the EDMOs. They are responsible for crafting and disseminating accurate and

timely information, engaging with the public, and coordinating with relevant authorities. Adequate personnel allocation ensures that the organization can maintain a strong online presence during emergencies. An officer from EDMO D reiterated these challenges in the following statements

> *"Budget constraints are common challenges. In such cases, we prioritize critical areas, seek additional funding sources, and explore partnerships with other agencies. We also have contingency plans in place to reallocate resources when needed."* General Services Officer, EDMO D.

These constraints can hinder the EDMOs' ability to effectively manage and leverage social media during emergencies. Addressing these challenges may require advocacy for increased funding, seeking partnerships with private sector organizations, or exploring cost-effective tools and strategies that maximize the impact of available resources. In one of the Facebook posts of EDMO C they utilized the power of social media to engage their audience and convey the urgency of their funding needs. Thus, allocating sufficient budget for social media activities can be a challenge for the EDMOs. This is consistent with Kaplan and Haenlein's (2010) research, which supports the notion that numerous organizations encounter constraints in terms of financial resources when it comes to investing in both social media tools and personnel. According to their findings, many organizations grapple with constraints related to financial resources when it comes to making investments in the realm of social media tools and personnel. In a rapidly evolving digital landscape, where social media has become a critical component of communication strategies, organizations often find themselves in a balancing act between their aspirations to harness the potential of social media platforms and the reality of limited financial means. Investing in social media tools, which includes platforms for analytics and content management, can be costly (Tuten & Solomon, 2017). Additionally, attracting and retaining skilled personnel who understand the nuances of social media strategy, content creation, and community management can strain budgets (Kaplan & Haenlein, 2010).

The resource constraints underscored above point to the importance of EDMOs carefully deliberating how to allocate their resources effectively for social media. It often involves prioritizing investments, seeking cost-effective solutions, and ensuring that the personnel tasked with managing social media assets are well-equipped with the necessary skills and knowledge to maximize the return on investment.

7.2.2 Securing Social Media Resources

This section examines both the *tangible* and *intangible* social media resources required by the EDMOs to achieve optimal communication outcomes in the lens of the RBT theory. Effective utilization of social media platforms during emergencies relies on various resources that facilitate successful communication strategies and outcomes.

7.2.2.1 Tangible Resources

Tangible resources refer to the physical assets that the EDMOs utilize to ensure effective communication during emergencies and disasters. To ensure effective communication during disasters, technology and infrastructure is paramount. This may comprise a range of resources, including computers, smartphones, internet connectivity, and other necessary hardware and software tools. Computers and smartphones serve as the primary devices through which the EDMOs can access and interact with social media platforms, allowing them to monitor real-time updates, respond to inquiries, and share information with the public. These devices can enable the EDMOs to stay connected, providing a means for quick and efficient communication during critical situations. Moreover, internet connectivity is vital for the EDMOs to establish a seamless connection with social media platforms. Reliable and high-speed internet access ensures smooth navigation, quick content sharing, and the ability to receive timely updates. This connectivity can enable the EDMOs to actively monitor social media feeds, track relevant hashtags or keywords, and engage with the public in real-time. In addition to devices and internet connectivity, the EDMOs rely on other hardware and software tools to enhance their social media communication efforts. These tools include content management systems, social media management platforms, analytics software, and monitoring tools. Content management systems allow the organization and scheduling of social media posts, ensuring a consistent and timely flow of information. Social media management tools provide features such as post scheduling, monitoring, and analytics, streamlining social media operations. Analytics software and monitoring tools help measuring the impact of communication strategies, track engagement metrics, and identify areas for improvement. To create visually appealing and engaging content, the EDMOs require graphic design resources or access to multimedia capabilities. Visual assets, such as infographics, images, videos, and animations, can enhance the effectiveness of communication on social media platforms and attract the attention of the audience. Table 3 shows the available tangible resources used by the various EDMOs for communicating emergency and disaster events.

Table 7.3 Tangible Resources used by the EDMOs for Disaster Communication

Tangible Resources			EDMO A	EDMO B	EDMO C	EDMO D	EDMO E
Desktop Computers			3	2	3	2	3
Laptop Computers			2	1	2	1	2
Smartphones			3	2	3	1	3
Tablets			2	1	5	2	3
Internet Connectivity	Broadband	Digital Subscriber Line (DSL)	√	√	√	√	√
		Fibre-optic			√		
	Wireless	Wi-Fi	√		√		√
		3G	√	√	√	√	√
		4G	√	√	√	√	√
		5G					
Social Media Management Tools					√		√
Monitoring and Analytics Software							√

Table 7.3 indicates that the EDMOs possessed a significant level of technology and infrastructure necessary for effective communication during disasters. This finding demonstrated that the EDMOs had access to computers, smartphones, tablets, internet connectivity, and software tools needed to engage with social media platforms.

While the findings revealed a positive trend in terms of technology and infrastructure availability, it also highlighted a deficiency in the utilization of social media management tools by the EDMOs. Social media management tools play a crucial role in streamlining and optimizing the management of social media platforms. These tools offer features such as content scheduling, analytics, monitoring, and sentiment analysis, which enhance social media operations and measure the impact of communication. It is essential for the EDMOs to recognize the importance of such tools and their potential to enhance their communication outcomes. Implementing these tools can provide the EDMOs with a comprehensive and streamlined approach to managing their social media presence, allowing them to efficiently engage with the public, track relevant metrics, and measure the effectiveness of their communication efforts. Thus, social media management tools and analytics play a crucial role in today's digital landscape, offering organizations valuable insights and efficiency in managing their online presence (Hanafizadeh, Shafia & Bohlin, 2021). This efficiency is critical in a fast-paced digital environment where timing and frequency of posts can significantly impact engagement and reach (Van der Vlist & Helmond, 2021).

The lack of enough computers, smart phones, and tablets were noticeable among the EDMOs during data gathering process. These challenges could be attributed to the inadequate allocation of resources, primarily stemming from budgetary constraints as discussed in section 7.2.1. One of the most apparent consequences of insufficient resources is limited access to technology. The EDMOs rely heavily on computers and smartphones for various aspects of their work which includes data collection, analysis, and communication with stakeholders. In the context of data gathering during disasters, computers, smartphones and tablets are indispensable tools. They facilitate the efficient collection and analysis of data, allowing the EDMOs to make informed decisions and track progress. Without an adequate number of these resources, data collection processes can be slow and inefficient. The significance of computer, smartphone and tablet resources for social media cannot be overstated in today's interconnected world. Smartphones and tablets have become the primary means of accessing social media because they offer mobility, which can allow the EDMOs to stay connected and engage with social media platforms anytime, anywhere. While smartphones and tablets are crucial, computers offer a larger screen and more comfortable typing experience. They are indispensable for creating and managing social media contents, especially during emergencies and disasters.

7.2.2.2 Intangible Resources

Intangible resources are referred to as non-physical assets which are often characterized by their qualitative nature, focusing on the skills, knowledge, relationships, and organizational factors that contribute to successful disaster communication (Paton et al., 2013; Veil et al., 2017). While they may not have a physical form, these resources hold significant value and impact. In addition to the tangible resources, the research findings revealed a number of *intangible* resources used by the EDMOs to effectively communicate emergency and disaster events on social media and these are discussed below.

Social Media Skills

Social media skills, a critical intangible resource, play a pivotal role in managing the complexities of social media platforms and tailoring communication strategies to engage with diverse audiences. One key area of skills is social media management which include understanding of various social media platforms, including their functionalities, algorithms, and best practices and proficient in utilizing tools and techniques to efficiently monitor, schedule, and analyse content across different platforms, ensuring a consistent and coordinated

approach to communication. When the EDMOs were asked to elaborate on the specific skills and expertise that their personnel bring to the table, an officer from EDMO A stated,

> *"As a member of the social media team, I have direct responsibility for posting updates related to any disaster event. I do possess an understanding of various social media platforms and know how to navigate their systems to ensure that our messages reach the right people at the right time."* Communications Assistant, EDMO A.

An officer from EDMO C also added,

> *"...content creation is a necessary aspect of communication on social media. Workers must have the creative flair to tailor messages that are informative and impactful and must know how to strike a balance between providing essential information and maintaining a tone of empathy during times of crisis. Whether it is a brief update for Twitter or a more detailed post on Facebook, they must adapt the content to suit each platform. Before assigning our social media team, we ensured that they possessed these qualities, understanding their critical role in effectively engaging with the public during emergencies. The ability to create compelling and relevant content is key to keeping the public informed, allaying fears, and fostering a sense of trust and support within the community*...." Health Communications Officer, EDMO C.

Social media skills are undeniably critical and indispensable resources for the EDMOs when harnessing the power of social media for effective communication during emergencies and disasters. As highlighted by Sutton et al. (2015), organizations need to possess social media management skills to navigate platforms effectively, engage with the public, and respond promptly to emerging situations. In a similar manner, this study underscores the critical role of skills and expertise in the effective utilization of social media for communication by the EDMOs during emergencies and disasters. Proficiency in social media management is essential components for ensuring that social media serves as a valuable tool in emergency and disaster management.

Collaborative Networks

Collaborative networks are another intangible critical resource utilized by the EDMOs for effective communication during emergencies and disasters. Establishing collaborative networks with relevant stakeholders, such as government agencies, community organizations, and partner entities, is a intangible resource that enhanced the EDMOs' social media communication efforts. Collaborative partnerships provide access to additional resources, expertise, and amplification of messages, leading to increased reach and impact. After explaining what collaborative network is in the context of this research during data gathering process, an officer from EDMO E emphasized its importance by stating,

> *"...we believe that networks will continue to be the backbone of disaster communication through social media. The power of collective effort and shared resources is unparalleled on these platforms. As social media continues to be a significant channel for emergency communication, this will be instrumental in keeping the public informed, engaged, and resilient during disasters."* Communications Officer, EDMO E.

In times of disasters, no single organization can handle all aspects of disaster communication alone. Collaborative networks empower the EDMOs to pool their resources, knowledge, and expertise, leading to a more comprehensive and coordinated response. By forging strong connections with various stakeholders, the EDMOs gained access to a wealth of additional resources and valuable insights that they leveraged to optimize their social media communication strategies. One such resource that they gained through collaborative networks is access to official and real time information as explained by an officer from EDMO A,

> *"...collaborative networks played a role during the floods. For example, through our partnership with the meteorological agency, we gained access to official and real-time information during the floods. This ensured that the messages we posted on social media were accurate and credible, providing the public with reliable updates."* Operations Officer, EDMO A.

Collaborative networks also played a key role in amplifying disaster communication messages on social media. When multiple organizations come together and share consistent messages across their respective platforms, the reach and impact of messages from the EDMOs expand significantly. This increased reach enables the EDMOs to effectively raise public awareness and prompt people to take appropriate actions during emergencies and disasters. An officer from EDMO C expounded,

> *"...our networks helped especially in amplifying our posts on COVID protocols. Resharing the posts ensured our messages reached a wider audience which allowed us to raise public awareness more effectively and encouraged people to take appropriate actions during the pandemic."* Head, Communications Department, EDMO C.

Thus, collaborative networks are an indispensable asset in disaster communication on social media. The collective effort of multiple organizations sharing consistent and credible messages amplifies reach, raises public awareness, and encourages proactive actions during emergencies and disasters. By working together, a stronger community that is better equipped to face and overcome the challenges of disasters can be created. This is supported by studies such as that of Sapat, Esnard and Kolpakov (2019) which highlight how collaboration during disasters can prompt the public to take preparedness measures and enable the sharing of information and resources across organizations, significantly amplifying the reach of disaster-related messages on social media while Guerrero et al. (2023) noted that when multiple organizations coordinate their communication efforts, they can collectively raise public awareness about disaster risks, preparedness, and response measures.

Expert Knowledge

Expert Knowledge is another important intangible resource that significantly impacts disaster communication on social media. Subject matter expertise is paramount to providing reliable

and credible content during emergencies and disasters. During disaster situations, the public relies heavily on social media for real-time updates and information. As such, it is imperative that the information shared by the EDMOs is based on authoritative sources and expert knowledge. Officers within the organization must possess a deep understanding of the specific challenges posed by various types of emergencies and disasters, as well as the appropriate response and mitigation strategies. An officer from EDMO B explained the relevance of such knowledge by stating,

> *"The reach of Facebook made it a primary platform for people seeking real-time information during the floods. As the floodwaters rise and the situation evolves, social media became a lifeline for affected communities, seeking guidance, safety measures, relief efforts, and the overall state of the disaster. Possessing knowledge on disaster management processes really helped in responding to these queries promptly and with accuracy..."* Public Relations Officer, EDMO B.

Expert knowledge indeed plays a pivotal role in disaster communication on social media. During emergencies and disasters, subject matter expertise becomes paramount to provide the public with reliable and credible content. As social media becomes a primary source of real-time updates and information during these situations, the importance of accurate and authoritative information cannot be overstated. Having subject matter experts involved in disaster communication on social media ensures that the information disseminated is well-informed and based on the latest developments and best practices. Their understanding of the specific challenges posed by scenarios of disasters enables them to provide accurate updates on the evolving situation. The public's reliance on social media during disasters makes it crucial for the EDMOs to uphold a standard of credibility and reliability. Subject matter experts play a significant role in ensuring that the information shared is trustworthy and comes from authoritative sources. An officer from EDMO B added,

> *"Our officers had expertise in epidemiology, virology and public health issues and had an understanding of the virus, its transmission, symptoms, and prevention measures. We were well-versed in the latest research and data, which allowed us to provide accurate and up-to-date information on COVID-19 and to also address false narratives and misconceptions that arose on social media platforms about the pandemic."* Operations Officer, EDMO B.

As noticed by Groeve (2020), expert knowledge is critical in disaster communication as it ensures the trustworthiness and credibility of the information shared. This allows the EDMOs to source information from authoritative sources, critically assess data, and craft informative messages. It is worth noting that while expert knowledge is paramount, the practicality of accessing such expertise in-house for every conceivable scenario may be challenging. As a result, EDMOs may find it necessary to outsource certain elements of expert knowledge. This outsourcing could involve collaborating with external specialists, research institutions, or

subject matter experts who can contribute their insights and knowledge to enhance the overall effectiveness of disaster communication strategies.

Protocols and Guidelines

Intangible resources, such as well-defined disaster communication protocols and guidelines, are invaluable assets that empower the EDMOs to effectively leverage social media platforms in their response efforts during emergencies and disasters. Having meticulously crafted disaster communication protocols and guidelines is akin to providing the EDMOs with a roadmap to navigate the landscape of social media during disasters. The protocols outline the step-by-step procedures for engaging with the public, disseminating information, and coordinating responses. They act as a compass, ensuring that every action taken on social media aligns with the overarching disaster management goals. Moreover, the establishment of clear procedures, roles, and responsibilities within the EDMOs is essential. It assigns specific tasks to individuals or teams, delineates their areas of expertise, and clarifies the chain of command. This clarity ensures consistent messaging, as it minimizes the risk of conflicting or contradictory information being shared. In the fast-paced world of social media, where misinformation can spread rapidly, consistency is paramount for maintaining public trust and preventing confusion. Significantly, in three of the case organizations, written and established protocols and guidelines were notably absent, and they relied on real-time or ad-hoc approaches to handle communication on social media. However, in the remaining two case organizations, instances of protocols or guidelines being utilized were observed as disclosed by an officer from EDMO E.

> *"...certainly, our organization had well-defined protocols in place. Designated team members monitored social media channels for incoming information and public inquiries on the flood, while others were responsible for crafting and disseminating official updates. This approach allowed us to maintain a consistent flow of accurate information, address concerns promptly, and keep the public informed and reassured throughout the crisis."* Communications Officer, EDMO E.

Protocols and guidelines assume paramount significance within the context of effective disaster communication on social media. These protocols serve as a strategic blueprint, describing the precise steps and measures to be undertaken when a situation on social media transcends the boundaries of routine management and necessitates a more robust response. Thus, they are not merely a set of guidelines but a critical framework that empowers the EDMOs to respond swiftly and effectively to the evolving dynamics of social media during disasters. By providing a structured pathway for recognizing, assessing, and managing escalated situations, the

protocols play an indispensable role in safeguarding public safety, preserving reputation, and maintaining trust in times of crisis. An officer from EDMO C reminisced,

> *"The protocol is essential because it outlines the steps to take when a situation on social media escalates. For instance, if a post goes viral and generates a massive public response, this protocol helps us determine when and how to involve higher authorities, subject matter experts, or legal teams to address the situation effectively. It ensures a swift response to the situation."* Advocacy and Social Mobilization Officer, EDMO C.

The significance of protocols cannot be overstated as it plays a pivotal role in the effective disaster communication strategy of the EDMOs. This protocol serves as the linchpin that ensures that the EDMOs are well-prepared to navigate the challenges of social media during a disaster, guaranteeing a prompt, mobilized, and coordinated response. An officer from EDMO E added,

> *"...the protocol ensures that our team is in place to manage social media channels during a disaster. When activated, this team can quickly mobilize, follow established procedures, and effectively coordinate responses. This protocol helps prevent delays and ensures that the right individuals with the necessary expertise are managing the organization's online presence."* Communications Officer, EDMO E.

Disaster communication protocols and guidelines are the foundation upon which effective social media communication during disasters is built. Like a roadmap, they offer direction and guidance, helping the EDMOs stay on course and steer through the challenges of social media, ultimately serving the vital purpose of safeguarding public safety and trust during times of disaster. Importantly, Haupt's (2021) research findings substantiate the assertion that disaster communication protocols are indispensable in the realm of social media during disasters. His study underscores the significance of these protocols in achieving the dual objective of safeguarding public safety and maintaining public trust. By adhering to established protocols and guidelines, the EDMOs are better equipped to uphold their responsibilities to the community, ensuring that information flows smoothly, and that the public remains informed and reassured even in the face of disasters.

Adaptive Learning and Training Culture

The cultivation of a culture that prioritizes continuous learning and training stands as a intangible yet invaluable resource for the EDMOs. This culture not only facilitates adaptability but also enables the EDMOs to continually refine and enhance their social media communication strategies. In the realm of social media and disaster communication, adaptability is paramount. The dynamic nature of digital platforms, coupled with the rapid pace of technological advancements, demands a constant process of refinement and adjustment. This is where a culture of continuous learning and training comes into play. It fosters an environment

where the EDMO personnel are encouraged and equipped to adapt, learn from past experiences, and remain agile in their approach to disaster communication. In the dataset, it is striking to know that only EDMO C and E embraced this culture of continuous learning and training. Specifically, evidences of workshops on building capacity of COVID-19 frontline health workers were noticed in EDMO C while a training manual was retrieved from EDMO E on disaster management. These programs have the potentials of positioning the EDMOs to respond effectively to the challenges and opportunities presented by the crises and equip them with the requisite skills and knowledge to navigate new challenges and technological advancements as they arise (Arslan et al., 2021). They offer a structured and proactive approach to professional development, ensuring that team members remain well-prepared to leverage the potential of social media for disaster communication. Such programs often facilitate the acquisition of expertise in crisis communication, social media management, data analytics, and digital tools. Additionally, they encourage personnel to reflect on past experiences, learn from both successes and setbacks, and apply these lessons to future endeavours. Table 7.4 presents a list of the intangible resources as used by the EDMOs.

Table 7.4 Utilization of Intangible Resources by the EDMOs.

Intangible Resources	Description	Utilization by EDMOs
Social Media Personnel/Skills	Skills in social media management, including platform understanding, algorithm comprehension, and proficiency in monitoring, scheduling, and analysing content.	The EDMOs utilized social media skills to navigate platforms effectively, engage with the public, respond promptly to emerging situations, and ensure a consistent and coordinated approach to communication.
Collaborative Networks	Establishing partnerships and networks with stakeholders, government agencies, community organizations, and partner entities to enhance social media communication efforts.	Collaborative networks empowered the EDMOs to pool resources, knowledge, and expertise for a more comprehensive and coordinated response. These networks provided access to additional resources, amplify messages, and increase reach.
Expert Knowledge	Subject matter expertise in disaster management, epidemiology, virology, public health, and other relevant fields to provide authoritative and credible content during emergencies.	The EDMOs leverage expert knowledge to ensure the trustworthiness and credibility of information shared on social media. Subject matter experts play a significant role in providing accurate updates on evolving situations.
Protocols and Guidelines	Well-defined disaster communication protocols and	Protocols and guidelines served as a strategic blueprint for the EDMOs,

	guidelines outlining procedures, roles, responsibilities, and steps to be taken on social media during crises.	providing a structured pathway for recognizing, assessing, and managing escalated situations on social media. They ensured a prompt, mobilized, and coordinated response.
Adaptive Learning and Training Culture	A culture that prioritizes continuous learning and training to enable adaptability, refinement, and enhancement of social media communication strategies.	The culture of continuous learning and training positioned the EDMOs to respond effectively to the challenges and opportunities presented by crises. Training programs equipped personnel with skills and knowledge to navigate new challenges and technological advancements.

7.2.3 Dynamic Capabilities of EDMOs

This section incorporates the DCV theory into the data analysis which aims to explore how the EDMOs effectively leveraged their resources. The DCV theory places emphasis on an organization's dynamic capability in adapting, renewing, and reconfiguring its resources and competencies in response to shifting circumstances and evolving environments. It underscores that merely possessing static resources may prove inadequate. Instead, it asserts that the ability to flexibly adapt and deploy resources in accordance with changing conditions is paramount for achieving long-term success. The concept of dynamic capabilities, as elucidated by Teece (2007a), comprises three fundamental processes: *sensing*, *seizing*, and *transforming*. In addition to these dynamic capabilities, two new capabilities emerged from the study which are *ordinary* and *collaborative* capabilities. The processes, as revealed in the findings and summarized in Figure 7.1, are elaborated upon in detail, along with an explanation of how the EDMOs applied them to optimize their resources.

7.2.3.1 Sensing Capabilities

Sensing, as described by Teece (2007a), encompasses the essential ability to keenly observe and comprehensively understand shifts and dynamics in the external environment. Within the context of this research, this concept takes on particular significance. Specifically, it calls for a steady attention when it comes to monitoring and interpreting not only traditional environmental changes but also contemporary technological advancements, with a special emphasis on the influential role of social media. The awareness of technological advancements, including social media, enables the EDMOs to adapt their communication strategies and disaster response tactics. It empowers them to engage with affected communities more effectively, disseminate crucial information rapidly, and mobilize resources efficiently. In the

fast-evolving technology landscape, staying well-informed and updated becomes not just an advantage but an imperative for the EDMOs.

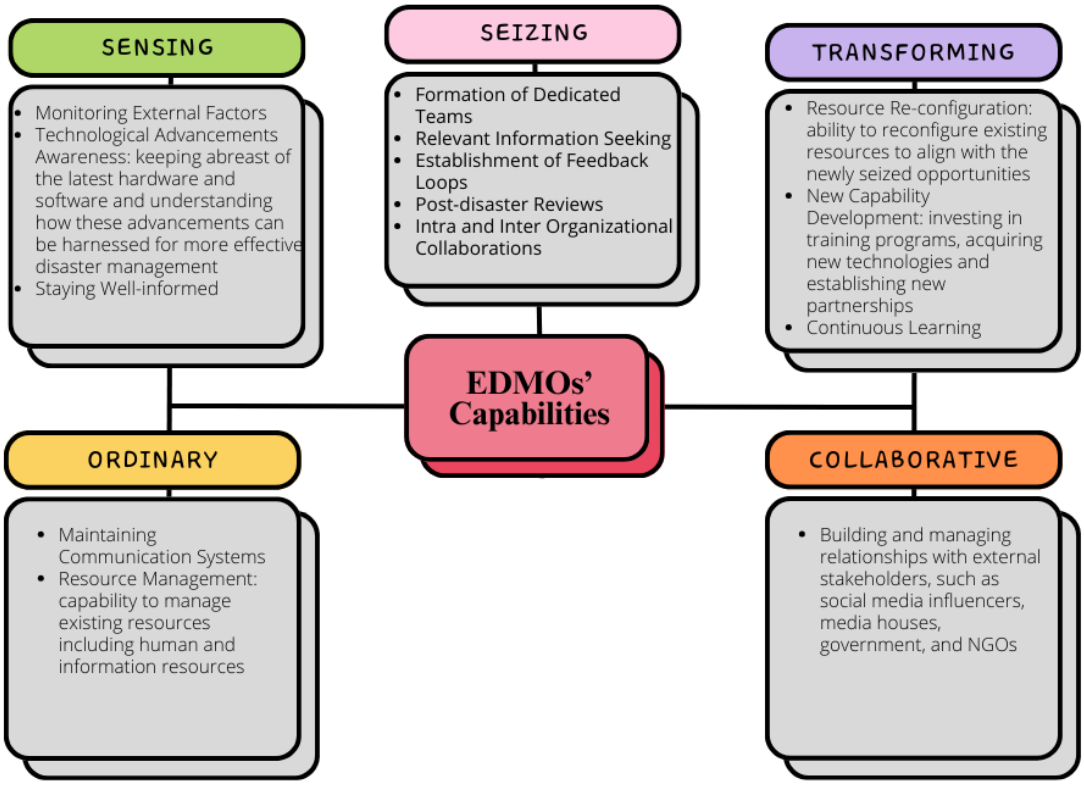

Figure 7.1 The EDMOs' Dynamic Capabilities

The external environment encompasses a wide array of factors, ranging from changes in disaster management processes to emerging technological innovations. However, in the context of technological advancements, the EDMOs must be particularly vigilant. The landscape of technology is characterized by constant evolution, with new tools, platforms, and solutions emerging at an astonishing pace. For the EDMOs, maintaining a heightened awareness of these technological shifts is essential. This involves not only keeping abreast of the latest hardware and software but also understanding how these advancements can be harnessed for more effective disaster management. It means closely monitoring trends in data analytics, artificial intelligence, communication technologies, and the internet of things, among others. An officer from EDMO E underscored the importance of monitoring external environment as stated below.

> *"... monitoring the advancement of technology enables us to identify innovative solutions that can streamline our operations and enhance communication and ultimately save lives during emergencies. By remaining at the forefront of technology, we position ourselves to adapt and respond swiftly to the changing dynamics of our work..."* Intelligence Officer, EDMO E.

The practice of scanning external environments is not just about keeping up with the times; it's about future-proofing the EDMOs against the challenges of an increasingly internetworked world. In an era characterized by rapid globalization and technological leaps, the challenges faced by the EDMOs have become increasingly multifaceted. Urbanization, population growth, and technological innovations have converged to create a dynamic operating environment for the EDMOs. By continuously scanning the external environment, the EDMOs can gain the ability to anticipate and prepare for these multifarious challenges. They can spot emerging trends, identify potential risks, and harness opportunities. This vigilance ensures that they remain on the cutting edge of disaster management techniques, equipped to adapt to the evolving needs of communities they serve. An officer from EDMO A reiterated,

> *"...we are in a highly interconnected world and what happens in one part of the globe can have far-reaching consequences elsewhere. For instance, a climate-related event in one region might cause ripple effects, impacting lives and even disaster response resources worldwide. Following these events enables us to understand these interdependencies, fostering collaboration even on a global scale."* Head of Communications, EDMO A.

Numerous research studies have placed a strong emphasis on the significance of monitoring external environments as a means to enhance the quality of organizational services. This principle applies across a wide spectrum of fields, including disaster management. The rationale behind this emphasis stems from the recognition that organizations, whether they are for-profit businesses or public service entities, exist within dynamic and ever-evolving contexts. In the public sector, agencies, including the EDMOs, have a vital role in ensuring the safety and well-being of their constituents. Research has highlighted the importance of such external monitoring exercises in terms of disaster preparedness and response. For instance, organizations that actively track emerging risks, technological innovations, and social trends are better positioned to protect their communities from the impacts of disasters and emergencies (Comfort et al., 2010). By continuously monitoring external factors, organizations can detect emerging threats or opportunities and adjust their strategies and operations accordingly (Eisenhardt & Martin, 2000b). Other research finds that organizations, such as the EDMOs, that engage in continuous environmental scanning are better prepared for disasters, pandemics, and other crises. They can mobilize resources effectively, coordinate responses, and provide timely assistance to affected populations (Birkland, 2006).

7.2.3.2 Seizing Capabilities

While observing the dynamics in the external environment is an essential starting point, the true value lies in an organization's ability to seize and capitalize on the opportunities that these changes present. This process of *seizing* opportunities is pivotal for the EDMOs seeking to

introduce innovations into their operations. The EDMOs showed four distinct processes of seizing opportunities presented by external environments, which are *formation of dedicated teams, relevant information seeking, establishment of feedback loops, post-disaster reviews,* and *intra and inter organizational collaborations.* These seizing capabilities are elaborated upon in the following sections.

Formation of Dedicated Teams

The establishment of dedicated teams for translating external insights into actionable strategies is a proactive approach that enhances the effectiveness of the EDMOs. These teams contribute specialized expertise, enable timely responses, align strategies with organizational goals, optimize resource allocation, and foster a culture of continuous improvement. As the external environment continues to evolve, such dedicated teams play a big role in keeping the EDMOs adaptable and resilient. A dedicated team can develop specialized expertise in environmental scanning and analysis. These experts can continuously monitor a wide range of information sources, including news, reports, and emerging technologies, and filter them for relevance to the organization's mission. By focusing exclusively on this task, they can uncover valuable insights that might otherwise be overlooked (Daft & Weick, 1984). Moreover, rapid response is often crucial in disaster management. Dedicated teams can process information quickly and identify emerging threats or opportunities as they arise. This agility enables the EDMOs to make timely decisions and implement strategies to mitigate risks or harness opportunities (Hamel & Valikangas, 2003). A dedicated team can ensure that insights from external scanning are closely aligned with the organization's strategic objectives. They can work collaboratively with top-level management to translate these insights into actionable strategies that directly support the organization's mission and goals (Kaplan & Norton, 2008).

It is particularly noteworthy that, among the five case organizations studied, only EDMO C and E demonstrated the foresight to establish dedicated teams specifically tasked with seizing the opportunities presented by their external environments. This distinction highlights the importance of such dedicated teams in the context of the EDMOs and their ability to proactively respond to changing circumstances. The presence of dedicated teams within the EDMOs provides them with a distinct strategic advantage. These teams are well-positioned to monitor external developments, whether they pertain to emerging technologies or community needs. Their exclusive focus on this critical function ensures that opportunities are promptly identified and acted upon. In situations such as disaster events where rapid responses are imperative,

having dedicated teams is a game-changer. The EDMOs can quickly assess the significance of external developments and adjust their strategies and resource allocation accordingly. This responsiveness can be instrumental in mitigating risks and capitalizing on opportunities presented by external forces.

Relevant Information Seeking

The collection of relevant information stands out as one of the key strategies employed by the EDMOs to effectively capture opportunities arising from their external environments. This data-centric approach is instrumental in several ways, ensuring that the EDMOs remain responsive, adaptable, and well-prepared in their disaster management efforts. Data collection equips the EDMOs with a comprehensive understanding of the external environment. By systematically gathering and analysing information from various sources, such as technological advancements, the EDMOs can make informed decisions. This data-driven decision-making process enables them to identify opportunities, assess risks, and allocate resources judiciously (Eisenhardt, 1989). An officer from EDMO B recounted.

> *"…in such situations, seeking relevant information becomes paramount. This practice enables us to remain attuned to changes in our work, which, in turn, aids us in recognizing opportunities. For example, we recently found the potential for collaboration with telecommunications companies to combine mobility and location data to see where people are assembling after a disaster strikes enabling us to pin point where aid is needed most."* Operations Officer, EDMO B.

In the realm of disaster management, time is an irreplaceable asset. Disasters can unfold rapidly and with little warning. Actively seeking and acquiring pertinent information ensures that the EDMOs are not caught off guard. It enables them to keep a vigilant eye on the external environment, promptly detecting any shifts in circumstances, be they emerging risks or evolving opportunities. The process of actively seeking information fosters a culture of continuous learning and improvement within the EDMOs. It encourages them to adapt to changing circumstances, and seek out innovative solutions. This culture of learning ensures that the EDMOs remain at the cutting edge of disaster management practices. Actively seeking information positions the EDMOs to identify innovative approaches, novel technologies, or collaborations that can enhance their disaster response and recovery efforts. An officer from EDMO C added.

> *"We encourage continuous learning and information-sharing here. Regular training sessions and workshops are organized to keep our staff informed about the latest trends and technologies. Additionally, we emphasize the importance of open communication, where team members can share new insights and ideas they come across."* Research and Health Policy Officer, EDMO C.

The proactive pursuit of information not only empowers organizations to stay ahead of the curve in understanding external environments but also positions them to harness the opportunities that emerge (Izumi et al., 2019). This approach underscores the importance of adapting to innovation, a fundamental aspect highlighted in numerous studies and reports on disaster management (Bennett, 2012; UNDRR, 2019). By actively seeking and acquiring relevant data, the EDMOs can enhance their preparedness and response efforts significantly. As demonstrated in the case of the telecom data collaboration as recounted by an officer from EDMO B (quoted above), such initiatives can be ground breaking (Williams & Bissessar, 2017; ITU, 2021). This commitment to staying informed and embracing innovative solutions ultimately contributes to enhancing the capacities of the EDMOs to serve and protect their communities during times of disasters (Lemiale, Prakash & Cruz, 2020). In a world marked by evolving risks and challenges, it is through these proactive strategies and a dedication to staying on the cutting edge of disaster management practices that the EDMOs can fulfil their mission effectively (UNDRR, 2019). The ability to adapt, innovate, and leverage emerging opportunities is not only a best practice but a necessity in safeguarding the well-being of communities during crisis.

Establishment of Feedback Loops

Building and nurturing feedback loops stands as one of the keystones of adaptability within the EDMOs which allows them to seize and capitalize on the opportunities presented by external environments. These loops are not just channels for communication; they are the vital conduits through which the EDMOs receive valuable insights, ensuring they remain responsive, agile, and continually improving in their mission. By actively seeking feedback from various sources, including team members, stakeholders, and the communities they serve, the EDMOs create a mechanism for scrutinizing their operations. This scrutiny facilitates the identification of areas where improvements can be made, thus fostering a culture of continuous refinement. An officer from EDMO E echoed the importance of feedbacks by stating that they act as early warning systems.

> *"When we receive feedback that indicates a need for adjustment, whether it is from our teams or the communities we serve, we respond swiftly. If we receive feedback, for example, about a specific community's needs during a disaster, we adjust our resource allocation or communication strategies to better address those needs in future."* Communications Officer, EDMO E.

Thus, feedback loops provide a valuable source of data that can inform decision-making. By systematically collecting and analysing feedback, the EDMOs are able to identify trends, patterns, and emerging issues. This data-driven approach allows for evidence-based decision-

making, which is critical in ensuring that resources are allocated judiciously and that response efforts are well-targeted.

In response to the question *"What mechanisms does your organization have in place for receiving feedback from team members, stakeholders, and communities?"*, an officer from EDMO B said,

> *"We have several mechanisms for feedback. Internally, we conduct regular team meetings and encourage team members to share their observations and suggestions. Externally, we maintain open channels of communication with stakeholders, such as government agencies and NGOs. We also actively engage with communities through outreach programs to gather their feedback directly."* Public Relations Officer, EDMO B.

The response exemplifies a multi-faceted approach to feedback collection, underscoring the EDMO's commitment to fostering open communication and engagement. This approach not only ensures that the EDMO remains receptive to the input of its team members, stakeholders, and communities but also positions it to make data-driven decisions and continuously improve its disaster management strategies. Furthermore, it reflects a culture of transparency, collaboration, and community-centric disaster management, which are key principles in effective emergency response efforts. Indeed, research in the field of disaster management consistently underscores the vital significance of feedback mechanisms. Feedback plays a crucial role in enhancing the effectiveness and resilience of organizations. Comfort et al. (2010) and Keith and Athena (2018) stress that feedback from various sources, including field personnel, stakeholders, and affected communities, provides disaster management organizations with real-time insights into the evolving disaster situation which enables better decision-making and resource allocation. They conclude that feedback data ensures that disaster responses are grounded in data and real-world observations, increasing the effectiveness of disaster management efforts. FEMA (2021) on the other hand asserts that timely feedback allows disaster management organizations to make informed decisions during a crisis which helps in prioritizing response efforts, optimizing resource allocation, and adjusting strategies based on changing circumstances.

Post-disaster Reviews

Conducting post-disaster reviews is an indispensable practice for the EDMOs seeking to uphold their effectiveness and adaptability in the field of disaster management. These reviews serve as essential checkpoints, enabling the EDMOs to assess their current capabilities, identify potential gaps, and realign their strategies to effectively address emerging effects from external environments in the form of opportunities and challenges. The reviews provide a structured

framework for the identification of operational gaps and vulnerabilities within the organization. By scrutinizing past performance and thoroughly evaluating response efforts, the EDMOs can pinpoint areas where improvements are needed. This proactive approach enables them to take targeted actions to address these gaps, thus enhancing their overall preparedness and response capabilities. Post-disaster reviews allow the EDMOs to assess how well their current strategies align with these evolving challenges. Whether it is adapting to current disasters or incorporating technological advancements, these reviews facilitate strategic realignment to meet these emerging challenges head-on. In tackling the challenges through conducting reviews, it enables the EDMOs to identify and capitalize on new opportunities that can enhance their disaster management efforts which might leverage innovative technologies or adopting best practices gathered from recent experiences.

There are notable disparities in the EDMOs post-disaster review practices when compared to one another. Three out of the five EDMOs diligently conducted regular post-disaster reviews; these reviews served as a cornerstone of their disaster management strategies, ensuring they remained adaptable and effective in responding to crises. Unfortunately, this was not the case for the remaining two EDMOs, which had only sporadically conducted such reviews in the past. These post-disaster reviews were undeniably pivotal in enhancing the adaptive capability of the EDMOs. They served as a dynamic learning process, allowing these organizations to assess their response strategies, identify areas of improvement, and refine their disaster management protocols. Over time, these regular reviews, especially in the case of the three EDMOs, had evolved into a systematic approach for them to fine-tune their strategies, ensuring they were better prepared for future disasters. However, the review process brought to light a pertinent issue that had significant implications during the COVID-19 pandemic. Specifically, EDMO C, which primarily focused on health-related emergency management, faced a distinct challenge in the form of inadequate technological support. This deficiency became glaringly evident as the pandemic unfolded, which is highlighted from a post-disaster review document retrieved from EDMO C.

> *"The pandemic demanded rapid and precise information gathering and dissemination. The organization's* [name of organization anonymized] *insufficient technological tools hindered its ability to collect real-time data on infection rates and healthcare capacity... remote work and collaboration became essential as lockdowns and social distancing measures were imposed. Health workers struggled to transition operations to a remote setup due to limitations in telecommuting infrastructure and collaboration tools. This impacted the* organization's [name of organization anonymized] *ability to function efficiently and maintain a consistent response effort..."* Extract from Document C3, EDMO C.

Thus, post-disaster review serves as an example of how the EDMOs can harness valuable insights to realign their strategies in response to emerging effects from external environments, which manifest in the form of both opportunities and challenges. Armed with insights from past events, the EDMOs can adapt and refine their strategies to align with changing external environments. This adaptive approach involves revising existing disaster response plans, upgrading infrastructure, enhancing training programs, and re-evaluating resource allocation. By doing so, the EDMOs can better position themselves to navigate future crises more effectively. Indeed, such realignment of strategies can be inferred from the statement of an officer from EDMO A.

> *"...after the floods, we evaluated the overall effectiveness of our disaster management efforts and we noticed that some of the areas where our team members struggled were related to evacuation procedures and logistics coordination. This was considered in our budget to equip our team with the skills needed to address similar challenges in the future..."* Head of Communications, EDMO A.

These examples illustrate the practical application of insights gained from a post-disaster review. They showcase the EDMOs commitment to learning from past experiences, addressing specific deficiencies, and proactively preparing their team to handle similar challenges more effectively in the future. By using the review to address forces from external environment and as a springboard for targeted training and skill development, the EDMOs aimed to enhance their overall disaster management capabilities and contribute to the safety and resilience of the community they serve. These examples align with previous research studies in the field of disaster management. These studies have emphasized the importance of post-disaster reviews as a catalyst for organizational improvement. They underscore the value of using these reviews not only to assess past performance but as a springboard for proactive measures aimed at strengthening disaster response and recovery efforts (Gajanayake et al., 2020). A key theme echoed in research is the idea of continuous learning and adaptation. Post-disaster reviews are viewed as integral components of a culture of learning within organizations. They encourage adaptive thinking and a commitment to evolving strategies and capabilities in response to changing circumstances (UNDRR, 2019). Studies have emphasized that disaster management organizations, informed by post-disaster reviews, make more informed decisions regarding resource allocation. This optimization of resources ensures that limited assets are deployed effectively to address vulnerabilities and gaps identified during the review process (Albris, Lauta & Raju, 2020).

Intra- and Inter-Organizational Collaborations

Collaboration between different departments within the organization and stakeholder organizations is vital for effective disaster management. It extends not only across different departments within the EDMOs but also to external stakeholder organizations. This collaborative approach fosters knowledge sharing, drives innovation, and allows for the pooling of resources, all of which are essential for seizing opportunities and addressing challenges effectively. Collaboration creates a synergy that strengthens the EDMOs' capability to respond to disasters, innovate in their approaches, and support the communities they serve. The ability to collaborate seamlessly with different departments and external stakeholders is a hallmark of a responsive organization, and it plays a pivotal role in fulfilling the mission of safeguarding communities during times of disaster. An officer from EDMO B captured this succinctly,

> *...when the units came together, obviously, they brought diverse perspectives and expertise to the table. This diversity of thought often leads to the generation of innovative ideas and approaches on dealing with the problem at hand."* Public Relations Officer, EDMO B.

This synergy of diverse thought processes serves as a fertile ground for creative problem-solving. It encourages the exploration of uncharted territories and the formulation of effective strategies to tackle the issues at hand. By drawing upon different perspectives and expertise, the collective intelligence of the units within the EDMOs can be harnessed to devise innovative solutions and enhance the overall effectiveness of their response efforts.

Stakeholder organizations play essential roles during emergencies and disasters, significantly bolstering the efforts of EDMOs in their response endeavours. An analysis of documents in this research has unveiled that stakeholder organizations often contribute specialized expertise. These organizations possess profound knowledge in specific domains, such as engineering (as evidenced by the collaboration between EDMO A, EDMO B and 48 Engineer Regiment, the engineering wing of the Ghana Armed Forces) or security (as demonstrated by the partnership between EDMO E (a security-based organization), the other EDMOs and Ghana Armed Forces). This specialized knowledge becomes exceptionally valuable during disasters, addressing the need for specific skills and insights within the EDMOs. Furthermore, stakeholder organizations act as vital resource amplifiers for the EDMOs. This augmentation covers the provision of personnel, equipment, and financial backing. For instance, in response to the Accra floods, medical institutions dispatched healthcare professionals to support EDMO C (a health-based organization), rendering critical aid in managing medical emergencies. Simultaneously, financial institutions and non-governmental organizations (NGOs) extended

financial contributions to all the EDMOs, bolstering their relief efforts. As a result, both intra-collaboration among various units within the EDMOs and inter-collaboration with stakeholder organizations were key in fortifying the comprehensive capability of the EDMOs for effective response to emergencies and disasters. These units and stakeholder organizations introduce a diverse array of skills, resources, and perspectives into the fold, significantly enhancing the robustness and comprehensiveness of disaster response and recovery efforts.

These findings are corroborated by previous research in the field of emergency and disaster management. Existing studies have consistently underscored the significance of stakeholder organizations in enhancing response capabilities (Khan et al., 2018). Their specialized expertise and domain-specific knowledge not only complement the efforts of the EDMOs but also contribute to a more comprehensive, effective, and coordinated response to emergencies and disasters (Gooding et al. 2022). Moreover, the synergy between disaster management organizations and stakeholder organizations has been a consistent theme in research. Rather than operating in isolation, these organizations collaborate closely to form a coordinated response network (Bjerge et al., 2016; IOM, 2021). This collaborative approach enhances the overall disaster response effectiveness. Stakeholder organizations act as force multipliers, leveraging their domain-specific knowledge to fill critical gaps in the response framework (Phattharapornjaroen, Carlstrom & Atiksawedparit, 2023). Their ability to seamlessly integrate their expertise into the EDMOs' operations results in a more holistic and well-rounded response to emergencies and disasters.

7.2.3.3 Transforming Capabilities

Teece (2007a) introduced the concept of *transforming capabilities* as a fundamental aspect of an organization's ability to adapt and thrive in a dynamic and ever-changing environment. *Transforming capabilities* refer to an organization's capability to modify, reconfigure, or even develop entirely new resources and capabilities in response to shifts in its external environment. This concept underscores the crucial role of adaptability and innovation in maintaining competitiveness and relevance. In the context of this research, the concept of transforming capabilities takes on particular significance as it pertains to the EDMOs. These organizations operate in a constantly evolving external environment, where disasters and emergencies can strike unexpectedly. Therefore, their ability to *sense* changes in the environment, *seize* opportunities (refer to sections 7.2.3.1 and 7.2.3.2 for sensing and seizing capabilities respectively) and subsequently *transform* their resources and capabilities is of paramount

importance. The EDMOs exhibited three transforming capabilities which are succinctly captured as *resource re-configuration*, *new capability development*, and *continuous learning*. The three transforming capabilities are discussed below.

Resource Re-configuration

Resource re-configuration covers the EDMOs' ability to reconfigure their existing resources and capabilities to align with the newly seized opportunities. This ability, as revealed in the research findings, involved reallocating personnel, modifying processes and protocols, and adapting existing technologies to suit the evolving needs. One facet of resource re-configuration as evidenced in the EDMOs operations involved the strategic deployment of personnel. EDMO A, for instance, recognized the need for a swift and strategic reallocation of personnel during the COVID-19 pandemic. This involved identifying specific skills and expertise that were urgently required to address the immediate priorities posed by the pandemic. Notably, personnel with medical expertise were in high demand due to the healthcare crisis. By strategically deploying these individuals to areas where their skills were most needed, EDMO A ensured that they could make the most significant impact on the response efforts. The adaptability in workforce allocation allowed EDMO A to address the immediate priorities associated with the pandemic effectively. With medical experts on the front lines, they could provide essential healthcare services and support overwhelmed healthcare facilities. This rapid response was critical in saving lives and mitigating the spread of the virus, showcasing the importance of aligning personnel with the most pressing needs during a crisis.

Another critical aspect of resource re-configuration involved the adjustment of existing processes and protocols. In the field of emergency and disaster management, the ability to adjust existing procedures in response to changing circumstances is paramount. The COVID-19 pandemic presented a stark example of the critical need for the EDMOs to adapt their existing processes and protocols rapidly. In the context of Ghana, the response of EDMO C serves as a notable case study highlighting the necessity of such adaptability in the face of a global health crisis. When the COVID-19 pandemic struck Ghana, EDMO C, like its counterparts nationwide, faced the unprecedented challenge of dealing with a highly contagious and rapidly spreading virus. The following points illustrate how EDMO C adjusted their response protocols and emergency control measures to effectively combat the pandemic.

> *"...we gathered information about the virus which included monitoring global and local health reports, studying the virus's transmission dynamics, and understanding the specific*

> *challenges it posed to the Ghanaian population. Recognizing that the pandemic required a multi-facet approach, we collaborated with various government agencies, healthcare providers, and local authorities. This collaboration ensured a coordinated allocation of resources. Hence, we revisited our emergency response plans to account for the unique characteristics of the COVID-19 virus. This involved re-evaluating procedures for testing, contact tracing, isolation, and treatment of infected individuals."* Advocacy and Social Mobilization Officer, EDMO C.

Resource re-configuration also extends to the adaptation of existing technologies. The EDMOs possessed a suite of technological tools and systems, albeit insufficient, that are integral to their operations. One illustrative case is the creative use of drones by EDMO C during the COVID-19 pandemic, which not only highlights the organization's adaptability but also underscores the potential for technological innovation in disaster management. Leveraging their existing technological infrastructure, they repurposed drones to transport essential medical supplies to remote and hard-to-reach areas. This repurposing of technology demonstrates the organization's ability to think creatively and adapt to the evolving demands of the emergency situation. The use of drones in disaster response is a prime example of how technology can be harnessed to enhance the effectiveness of EDMOs. Drones offer several advantages, including rapid deployment, access to remote areas, and the ability to carry critical supplies such as PPEs, medicines, and diagnostic equipment. In the context of the pandemic, drones became a valuable tool for ensuring that healthcare resources reached even the most isolated communities. Ghana was among the first African countries to adapt drone technology for healthcare delivery especially during the pandemic (Sylverken, 2022). This not only showcases commitment to innovation but can also have a positive influence on neighbouring countries and encourage the adoption of similar technologies to enhance disaster preparedness and response. The successful integration of drones into disaster response by EDMO C highlights the scalability and adaptability of such technological solutions. Drones can be used in various disaster scenarios, from disease outbreaks to disasters like floods. Their versatility makes them a valuable asset for the EDMOs seeking to improve their response capabilities. Drones can also be utilized for data collection and surveillance during disasters. They can capture real-time imagery, assess damage, and monitor the movement of people in affected areas. This data is invaluable for decision-making and resource allocation for disaster management.

New Capability Development

The EDMOs may need to, in some cases, develop entirely new resources and capabilities to effectively respond to emerging challenges or opportunities. The ability to respond effectively to emerging challenges and opportunities often necessitates the development of entirely new

resources and capabilities. This could involve investing in training programs, acquiring new technologies, or establishing new partnerships. This approach is crucial for staying ahead of evolving threats and ensuring robust disaster response and recovery efforts.

One fundamental way the EDMOs developed new capabilities was by investing in training programs. These programs included a wide range of skills and expertise, from disaster response tactics to advanced technologies. For example, EDMO B had a training program for teaching their officers in the latest search-and-rescue techniques as can be derived from the following extract.

> *"... moving to the new building while simultaneously undertaking training on the use of new search and rescue kits is a complex and critical undertaking that required careful planning and execution. This transition involved several key aspects that were considered..."* Document A3, EDMO B.

EDMO C on the other hand equipped their workers with specialized training for handling infectious disease outbreaks. By equipping its workers with specialized training EDMO C demonstrated its commitment to public safety and its readiness to respond effectively to public health emergencies. This level of preparedness not only protects the health of responders but also contributes to the overall resilience of the organization during pandemics. An officer from EDMO C stated.

> *"...the preparedness extended beyond safeguarding the health of our responders. It also significantly contributed to the overall strength of our organization during the pandemic. As one of the frontline officers fighting the pandemic, I can attest to the significance of this specialized training and its impact on our ability to serve the community..."* Health Communications Officer, EDMO C.

Collaboration is one of the keystones of effective emergency and disaster management. As a way of assessing new resources, the EDMOs made new partnerships with government agencies, NGOs, private companies, and community groups. These partnerships provided access to additional resources, expertise, and support during disaster events. For instance, EDMO A's partnership with many business entities provided essential supplies during the Accra floods, ensuring the affected community had access to much-needed provisions. This collaborative effort not only highlights the importance of partnerships in emergency and disaster management but also underscores the diverse range of entities that can contribute to effective disaster response as reported by the Ghana News Agency (GNA).

> *"Accra Brewery Limited (ABL), on Thursday donated food items worth GHS 30,000 to the National Disaster Management Organization (NaDMO) in Accra, to be distributed to victims of the June 3 floods and fire disasters. The items included 50 bags of rice, 100 gallons of cooking oil, 100 bags of sugar, 50 cartons of milk..."* GNA News, June 11, 2021.

Addressing emerging challenges or capitalizing on new opportunities from the external environment often requires organizations to embrace and integrate new technologies into their operations. One exemplary case of a proactive approach to technology integration can be seen in the actions taken by EDMO C during the COVID-19 pandemic. They recognized the pressing need for efficient contact tracing and adopted the GH COVID-19 Tracker App, demonstrating their capability to leveraging technology for emergency management. The GH COVID-19 Tracker App served as a vital tool in the fight against the pandemic. Its innovative features allowed the organization to respond swiftly and effectively to the challenges posed by the virus while also exploring new opportunities. The App enabled EDMO C to trace the contacts of individuals who had tested positive for the virus. By utilizing various data sources, such as telephone-related data, the App could swiftly identify potential exposure points. However, despite its potential benefits, the GH COVID-19 Tracker App was marred by several controversies. Most significantly, there were serious concerns about the App's impact on the privacy of Ghanaian citizens. Critics argued that the App's extensive data collection capabilities, such as the ability to access users' location data and personal information, posed significant risks to individual privacy. There were fears that the data collected could be misused by the government for surveillance purposes beyond the scope of public health, potentially violating citizens' rights to privacy. Moreover, the App lacked clear communication about its data protection measures and how long the data would be stored, further fueling public apprehension (Shrestha, 2021). These controversies highlighted a critical tension between the need for effective public health tools and the protection of individual privacy and civil liberties. Nevertheless, the advanced contact tracing helped reduce the spread of the virus in Ghana. One of the most valuable aspects of the App was its ability to link infected individuals with health professionals promptly. This ensured that those who had contracted the virus received immediate medical attention and guidance, which is crucial in managing a contagious disease. EDMO C also used the App as a platform for public awareness and education. They disseminated information about preventive measures, testing facilities, and vaccination centres through the App, helping to keep the community well-informed and engaged in the fight against COVID-19. By adopting the GH COVID-19 Tracker App, EDMO C not only addressed the immediate challenge posed by the pandemic but also positioned themselves as an organization that could respond dynamically to emerging crises. This proactive approach demonstrated their ability to harnessing new technologies for the betterment of society.

Continuous Learning

Transforming capabilities require a culture of continuous learning and improvement within organizations. This includes the ability to learn from past experiences, assess the effectiveness of new initiatives, and iterate on strategies to enhance future responses. The findings show that EDMOs A, C and E have exhibited the capability of *continuous learning*— an aspect that is underrepresented in the DCV theory (Penrose, 2009). The findings in this research bridge this theoretical gap by shedding light on the connection between transformative capability and an organization's capability to learn and adapt. Traditionally, *Transforming Capability*, a central construct in the DCV theory, primarily referred to an organization's ability to modify or reconfigure its resource base to seize new opportunities or respond to competitive threats. However, a critical void in these theories pertained to an organization's ability to draw valuable insights from its past experiences. The transformative potential of learning from past experiences remained underexplored in the existing theoretical frameworks, leaving a considerable knowledge gap.

The feature of the EDMOs, as discerned from the research findings, to learn from post-disaster reviews is quite commendable. These organizations have established processes that facilitated the extraction of invaluable insights from their encounters with the Accra floods and COVID-19 pandemic. These insights were then integrated into their ongoing strategies and operations. This proactive approach not only ensures that lessons learned are not forgotten but also enables the EDMOs to continuously refine and enhance their disaster response capabilities. An officer from EDMO A had this to say.

> *"...of course, all of these challenges and lessons were recorded in the report, providing us with a valuable document for reference and strategic adjustments. One substantial takeaway from the report, in my perspective, revolves around the need to reorganize our incident command structure..."* Head of Communications, EDMO A.

This underscores the need for learning from experience and using that knowledge to drive improvement and to adapt and enhance organizational capabilities. The process of restructuring EDMO A's command structure represents a tangible manifestation of their dedication to *continuous learning* and improvement, ultimately positioning them for better disaster management.

In the context of EDMO C, notable lessons have been gathered from previous experiences, particularly during the challenging period of the COVID-19 pandemic. These lessons have been woven into the fabric of their current processes, fostering resilience, adaptability, and

overall enhancement. One of the remarkable lessons that EDMO C has assimilated is the importance of preparedness in the face of unexpected crises. The COVID-19 pandemic underscored the critical need for robust contingency plans, swift decision-making, and flexible operational frameworks. As a result, EDMO C has not only refined its emergency response protocols but has also established a proactive approach to identifying potential risks and developing comprehensive mitigation strategies. Furthermore, the pandemic has illuminated the significance of remote work and digital transformation. EDMO C has embraced this shift by equipping its workforce with the necessary tools to seamlessly operate from diverse locations. This newfound agility has ensured continuity of operation and expanded their reach and engagement with stakeholders.

EDMO E, a security-focused organization, has also recognized and integrated the valuable lessons learned from the COVID-19 pandemic into its operational framework. These lessons have not only enhanced their ability to protect and safeguard, but they have also sharpened their overall approach to security. Digital transformation has been a key lesson for EDMO E and they have integrated this lesson by improving their internal communication channels to enable swift decision-making and cohesive teamwork. An officer from EDMO E stressed,

> *"In the wake of the pandemic, remote work and virtual collaboration became the norm which resulted in upgrading our communication infrastructure to support remote work and virtual meetings. Now our officers are able to attend meetings and collaborate with us from diverse locations...*" Communications Officer, EDMO E.

The concept of transforming capabilities in the context of the EDMOs, in the form of *resource re-configuration*, *new capability development*, and *continuous learning* as outlined in the discussions above, signifies their capability to not only react to changing external environments but also to be proactive in identifying and leveraging opportunities that arise from these changes. It emphasizes the importance of adaptability, innovation, and the ability to evolve in response to evolving risks and challenges. By cultivating transforming capabilities, the EDMOs can fulfil their mission effectively in safeguarding communities during times of disaster. Bullock, Haddow and Coppola (2020) made a similar assessment in their study by concluding that developing entirely new capabilities, whether through specialized training, technology acquisition, or partnerships, underscores an organizations' forward-thinking approach which enables them to anticipate emerging challenges and equip their personnel with the necessary skills and tools to work effectively. Duchek (2020) on the other hand emphasizes that transforming capabilities enable organizations to be proactive. Instead of merely reacting to events as they occur, transforming capabilities lead them to actively prepare for and

anticipate various scenarios. This proactive stance allows them to respond swiftly and effectively when disasters strike, minimizing their impact on communities.

7.2.3.4 Ordinary Capabilities

Ordinary capabilities in the context of this research refer to the everyday, internal routine activities and processes that form the foundation of EDMOs' operations which are crucial for effective disaster response. It is worth noting that within the broader field of disaster management and organizational theory, the concept of *ordinary capabilities* has not received as much attention as it deserves. This lack of attention is particularly evident in the DCV theory (Teece, 2007a; Teece, Pisano & Shuen, 1997) and RBT theory (Barney, 1991; Penrose, 2009) used in this research. The DCV and RBT frameworks primarily emphasize dynamic and strategic capabilities, focusing on an organization's ability to adapt, innovate, and create competitive advantages in the face of changing environments. While these dynamic capabilities are undoubtedly important for the EDMOs, they should not overshadow the significance of *ordinary capabilities*. Ordinary capabilities include the routine activities and processes that occur within the EDMOs on a day-to-day basis. These *ordinary capabilities*, as realized from the dataset, are *maintaining communication systems* and *resource management.* These routine tasks and processes are the backbone of the EDMOs' operational readiness and preparedness. Without strong *ordinary capabilities*, the EDMOs may struggle to respond effectively to disasters when they occur. For instance, if communication systems are not properly maintained, they may fail when needed most during a disaster. If staff are not adequately trained and prepared in non-emergency situations, their ability to respond swiftly and efficiently during a crisis may be compromised.

Maintaining Communication Systems

Maintaining communication systems is not just an *ordinary capability* but a fundamental and indispensable aspect of effective disaster management. Out of the five case organizations, EDMOs A, C, and E have made significant investments in establishing and maintaining their communication systems to ensure they are well-prepared for emergency situations. The primary objective behind maintaining these communication systems is to facilitate the seamless flow of vital information during crises. In disaster management, timely information can mean the difference between life and death. These communication systems serve as lifelines, enabling these organizations to gather real-time data about the disaster's impact, assess the immediate needs of affected communities, and formulate well-informed response strategies.

One of the advantages of having well-maintained communication systems is their ability to foster internal coordination within these organizations. During emergencies and disasters, efficient collaboration among different departments and teams is paramount. These systems provide a reliable means for teams to communicate, share critical updates, and coordinate their efforts. This internal coordination ensures that resources are deployed effectively, minimizing response time and maximizing the impact of relief efforts. Moreover, these communication systems significantly enhance the EDMOs' agility in disseminating essential information to the public. During a disaster, informing the public about the situation, safety measures, and evacuation procedures is of utmost importance. Having functional and maintained communication systems can enable the EDMOs to reach out to the public through various channels including social media. This rapid and widespread dissemination of information can help save lives by ensuring that people are aware of the situation and know how to protect themselves. Research studies consistently support the importance of functional communication systems in emergency management. These findings highlight the correlation between swift and effective communication systems and the ability to save lives and minimize the impact of disasters (Haupt, 2021; Johnston, Taylor & Ryan, 2020). By leveraging these systems, the EDMOs are able to disseminate information and empower individuals with the knowledge needed to protect themselves and their communities (Abbas, 2020).

Resource Management

Another *ordinary capability* of the EDMOs is their capability to manage existing resources effectively. Effective resource management is a key element of disaster management. A significant aspect of resource management involves human resources, which are central to any disaster management endeavour. The EDMOs' human resource management practices included an implementation of a recruitment strategy that involves deploying personnel with various skills and expertise, establishing clear chains of command, providing continuous training, and ensuring the safety and welfare of their staff. An officer from EDMO B echoed,

> *"... sure, we have a recruitment plan in place. We seek individuals with a diverse range of skills and expertise relevant to disaster management. During disasters, we deploy our personnel based on their skills and the specific requirements of the situation."* Public Relations Officer, EDMO B.

An officer from EDMO D added,

> *"Training is a continuous process for us. We provide regular training sessions to keep our personnel up-to-date with the latest disaster management techniques and technologies. We also conduct drills to enhance their practical skills and readiness."* Operations Officer, EDMO D.

The EDMOs also had safety protocols in place for various disaster scenarios by making sure their personnel were well-equipped with the necessary protective gear and tools. This proactive approach meant that the officers were adequately prepared to handle hazardous situations and minimize potential risks to their health and well-being. They were equipped with protective gear such as helmets, gloves, masks, and hazmat suits, ensuring that they could operate confidently and safely in the most hazardous environments. The safety protocols were not just an afterthought but an integral part of the EDMOs' disaster management strategy. An emergency management protocol document retrieved from EDMO C emphasized the paramount importance of adhering to these safety measures. It underscored the notion that the protection of personnel was not negotiable and was essential to the overall success of their operations. These safety protocols were dynamic and adaptable, recognizing that different disaster scenarios demanded unique strategies. Furthermore, the training and continuous education of the EDMOs' personnel played a pivotal role in ensuring the effectiveness of these safety protocols. Responders were regularly trained in the proper use of protective gear and tools, as well as the latest advancements in disaster management techniques. This ongoing commitment to education empowered them to make informed decisions in disaster situations, further enhancing their safety and effectiveness.

Another important aspect of resource management pertains to information management. Accurate and up-to-date information is critical during a disaster. The EDMOs are responsible for gathering, analysing, and disseminating information to relevant stakeholders, including the public, government agencies, and partner organizations. Information management involves establishing communication systems and information-sharing protocols to ensure that decision-makers have access to timely and accurate information. Notably, the case organizations, particularly EDMOs A, C, and E, have made substantial investments in developing and maintaining their communication infrastructure. These investments signify their commitment to enhancing their capabilities in information management, emphasizing the importance of staying connected and informed in times of crisis. However, it is essential to highlight a potential area of improvement. Despite the investments in communication systems, there appeared to be a lack of evidence concerning information-sharing protocols among the EDMOs. Information-sharing protocols play a vital role in ensuring that information is disseminated effectively, securely, and in accordance with predefined procedures.

The *ordinary capabilities* of EDMOs in their abilities to manage existing resources efficiently is crucial for effective disaster management. Studies have consistently shown that organizations with well-structured resource management systems are better equipped to respond to disasters, mitigate their impact, and facilitate recovery (Doan & Shaw, 2019; Edvardsson & Durst, 2021; Fontes de Meira & Bello, 2020; Kusumasari, Alam & Siddiqui, 2010). Moreover, organizations with robust resource management systems are more resilient in the face of future crises. They are better prepared to adapt to changing circumstances, allocate resources effectively during ongoing emergencies, and learn from past experiences. This adaptability and resilience are essential qualities for the EDMOs, as disasters can vary in scale, nature, and complexity.

7.2.3.5 Collaborative Capabilities

One of the new themes which emerged from the dataset has to do with *collaborative capabilities* of the EDMOs. The EDMOs exhibited qualities of building and managing relationships with external stakeholders, such as social media influencers, media houses, government, and NGOs. The EDMOs' ability to engage with social media influencers is indicative of their recognition of the power of digital platforms in disseminating critical information during emergencies. By collaborating with influencers who possess a significant online following, the EDMOs were able to harness the reach and impact of social media to rapidly communicate vital instructions, safety measures, and updates to the public. This not only enhanced their outreach but also facilitated real-time feedback and community engagement. An officer from EDMO A explained.

> *"... we identified influencers whose values aligned with our mission and core works. These partnerships helped us to disseminate vital information to their followers during the pandemic. These partnerships were mutually beneficial, as influencers gained credibility by supporting a good cause, and we gained access to their extensive reach."* Communications Assistant, EDMO A.

In essence, this collaborative approach represents a harmonious convergence of shared values, leveraging the strengths of both the EDMOs and social media influencers. It exemplifies the synergy that can be achieved when organizations recognize the potential of digital platforms and influencer partnerships as dynamic tools in their arsenal for effective emergency communication and community engagement.

Collaborating with government agencies and NGOs is crucial for efficient disaster response. The EDMOs have established synergies with relevant government departments, allowing for the quick allocation of resources and sharing of critical information. For instance, EDMOs C

and E have established close working relationships with government agencies such as the Ministry of Health (MoH) and the Ministry of Interior (MoI), respectively. These collaborations are essential for disaster response. They enable the rapid allocation of crucial resources, such as medical supplies and personnel, and facilitate the seamless sharing of critical information. For instance, during the COVID-19 pandemic, EDMO C coordinated closely with the MoH to ensure the deployment of healthcare resources where they were most needed, while EDMO E worked alongside the MoI to manage logistics and maintain public order. These partnerships underscore the importance of interagency cooperation in times of disasters. On the other hand, EDMO D actively established partnerships with NGOs. These collaborations bring significant benefits to disaster response efforts. NGOs often possess specialized skills, resources, and a strong presence in affected communities. They complement the EDMOs' capabilities by offering specific services, such as humanitarian aid distribution, medical assistance, or psychological support. These partnerships are characterized by shared goals and a commitment to providing timely and effective assistance during emergencies.

Thus, *collaborative capabilities* exhibited by the EDMOs in building and managing relationships with external stakeholders is a significant and dynamic aspect of their disaster management strategies. It underscores the importance of collaboration in ensuring the safety and well-being of communities during emergencies and disasters. The emergence of this new theme offers a compelling opportunity to enrich and extend the theoretical frameworks underpinning this research, notably the DCV as proposed by Teece (2007a) and the RBT as advanced by Barney (1991). The DCV framework emphasizes the inherent dynamism within organizations, emphasizing their ability to adapt and evolve over time. This newfound theme within the EDMOs underscores their agility and adaptability in engaging with external stakeholders. By actively establishing and nurturing relationships with these diverse entities, the EDMOs displayed their capability to respond effectively to disaster scenarios. This insight augments the DCV framework by highlighting the significance of strategic alliances and relationship-building as essential facets of an organization's dynamic capabilities. Furthermore, the RBT framework centres on the role of an organization's resources and capabilities in driving competitive advantage. The theme of *collaborative capabilities* showcased by the EDMOs illuminates how their ability to engage with an expansive network of stakeholders can be considered a valuable resource. These interactions serve as conduits for information, expertise, and support during times of disasters. Consequently, this new theme accentuates the relevance of stakeholder relationships as a distinct resource within the RBT framework, thereby

deepening our understanding of how organizations in the field of disaster management can leverage such resources to enhance their resilience and effectiveness.

7.3 Summary of Chapter

This chapter dealt with the last theme of data analysis being *implementing necessary changes* aligned with the sixth construct in the STREMII model while embedding the RBT and DCV theories for the analysis. This phase of the research involved a review of the social media strategies employed by the EDMOs aiming to explore the capabilities of the EDMOs. By analysing the data, valuable insights were derived to strengthen the EDMOs' effectiveness and efficiency in their operations. The focus was not only on identifying areas for improvement but also on exploring tactics that could be implemented to achieve better outcomes. Thus, through the analysis of the social media resources and strategies, the aim was to uncover potential challenges, and untapped opportunities that could be addressed.

The research findings show that while social media can be a valuable tool for the EDMOs, they also encountered a myriad of challenges. Despite the challenges encountered by the EDMOs, their ability to effectively respond to emergencies and disasters was greatly facilitated by a range of valuable resources, including both *tangible* and *intangible* assets. These resources played a pivotal role in enabling the EDMOs to achieve optimal communication outcomes in the midst of emergencies and disasters.

The study delved into how the EDMOs not only possessed valuable resources but also succeeded in their ability to dynamically harness and optimize these resources to respond effectively to the ever-changing circumstances and evolving environments associated with emergencies and disasters. It highlighted that having static resources alone is insufficient; what truly matters is the EDMOs' capability to *sense*, *seize*, and *transform* these resources in response to shifting conditions, thereby ensuring their long-term success in disaster management.

It is important to note that the data analysis revealed new themes that play a significant role in addressing gaps in the DCV theory (Teece, 2007a) and RBT theory (Barney, 1991). The data analysis highlights that the EDMOs have demonstrated the capability for *continuous learning*, a novel theme emerging from this study. This aspect is relatively underrepresented in both the DCV and RBT theories. This study bridges this theoretical gap by elucidating the connection between transformative capability and an organization's ability to learn and adapt.

Traditionally, *Transforming Capability*, a central concept in DCV and RBT theories, primarily referred to an organization's ability to reconfigure its resource base to seize opportunities or respond to competitive threats. However, these theories had a noticeable omission concerning an organization's capability to derive valuable insights from its past experiences. The transformative potential of learning from past experiences remained inadequately explored within existing theoretical frameworks, creating a substantial knowledge gap. Another emerging theme from the study is the concept of *Ordinary Capabilities*, which encompasses internal routine activities and processes that constitute the foundation of EDMOs' operations and are vital for effective disaster response. In the broader context of disaster management and organizational theory, the concept of *ordinary capabilities* has not received the attention it warrants. This deficiency is particularly evident in the DCV and RBT theories employed in this research. These frameworks predominantly emphasize dynamic and strategic capabilities, focusing on an organization's ability to adapt, innovate, and gain competitive advantages in dynamic environments. While dynamic capabilities are undeniably crucial for EDMOs, they should not overshadow the importance of *ordinary capabilities*.

Furthermore, the study brought to light the *collaborative capabilities* exhibited by the EDMOs as yet another new theme. These collaborative capabilities involve building and managing relationships with external stakeholders, constituting a significant and dynamic aspect of their disaster management strategies. This underscores the pivotal role of collaboration in ensuring the safety and well-being of communities during emergencies and disasters. The emergence of this new theme presents an excellent opportunity to enrich and extend the theoretical frameworks that underpin this research, particularly the DCV and the RBT theories. The DCV framework underscores the inherent dynamism within organizations, emphasizing their adaptability and evolution over time. This newfound theme within the EDMOs highlights their agility and adaptability in engaging external stakeholders actively. By establishing and nurturing relationships with diverse entities, the EDMOs were able to respond effectively to disaster scenarios. This insight enhances the DCV framework by emphasizing the importance of strategic alliances and relationship-building as essential facets of an organization's dynamic capabilities. Moreover, the RBT framework centres on an organization's resources and capabilities as drivers of competitive advantage. The theme of *collaborative capabilities* showcased by the EDMOs highlights how their ability to engage with a wide network of stakeholders can be considered a valuable resource. These interactions provide mechanisms for information, expertise, and support during disasters. Table 7.5 summarizes both the tangible

and intangible resources, as well as the dynamic capabilities of the EDMOs, from the perspective of the RBT and DCV theories.

Table 7.5 Overview of EDMOs' Resources and Capabilities Through RBT and DCV Frameworks.

Theory	Construct	Example
RBT	Tangible	Desktop and laptop computers, smartphones, tablets, internet connectivity, social media management tools, and monitoring and analytics tools.
	Intangible	Social media personnel/skills; collaborative networks; expert knowledge; protocols and guidelines; adaptive learning and training culture.
DCV	Sensing	Monitoring external factors; Technological Advancements Awareness: keeping abreast of the latest hardware and software and understanding how these advancements can be harnessed for more effective disaster management; Staying well-informed
	Seizing	Formation of dedicated teams; relevant information seeking; establishment of feedback loops; post-disaster reviews, and intra and inter organizational collaborations.
	Transforming	Resource re-configuration: ability to reconfigure existing resources to align with the newly seized opportunities; New capability development: investing in training programs, acquiring new technologies and establishing new partnerships; Continuous learning.
	Ordinary*	Maintaining communication systems; Resource management: capability to manage existing resources including human and information resources.
	Collaborative*	Building and managing relationships with external stakeholders, such as social media influencers, media houses, government, and NGOs

* These are new themes (constructs) and contributions to theory arising from the research.

CHAPTER EIGHT
DISCUSSION OF THE FINDINGS

8.1 Introduction

This chapter discusses findings of the study, which centres on the usefulness of social media as a valuable communication tool during emergencies and disasters. The discussion addresses the research questions with reference to extant literature, STREMII model (Stewart & Wilson, 2015), DCV theory (Teece, 2007b) and RBT theory (Barney, 1991). The aim of this study was to investigate the *extent to which social media can be used for emergency and disaster communication.* By exploring how the EDMOs used social media for communication, we were able to gain valuable insights into the evolving landscape of emergency and disaster communication. This study meant to shed light on the practical applications, challenges, and potential benefits of harnessing social media platforms as a means to gather and disseminate critical information during times of disaster. Emergency and disaster situations are characterized by their sudden and often unpredictable nature, making rapid and efficient communication of the utmost importance. Traditional modes of communication, while valuable, may not always meet the demands of real-time information sharing required in such scenarios. Social media, with its widespread usage and instantaneous reach, has emerged as a potent tool that can bridge this gap. To ascertain its full potential, we explored how different emergency and disaster management organizations utilized social media in their communication strategies.

The chapter provides a detailed explanation of the findings in alignment with the sub-questions that directed the research:

1. In what ways can social media be used for gathering emergency and disaster information?
2. How is information disseminated by the EDMOs during emergency and disaster events?
3. How did the disseminated information impact on emergency and disaster risks management?
4. What are the current capabilities of the EDMOs to use social media?
5. How could their capabilities be increased?

To effectively navigate this discussion, the chapter is organized into five distinct sections. Drawing on insights from Chapters 6 and 7, section 8.2 provides a summary of the central

themes emerging from the research findings based on the research questions. Sections 8.3 through 8.5 serve as the heart of the discussion, where we delve into these key thematic elements in detail. The primary focus is on the research questions, which guide the discussion on how social media can be effectively leveraged as a communication tool during emergencies and disasters. Additionally, we aim to identify strategies that can be employed to augment the capabilities of EDMOs in harnessing the potential of social media.

8.2 Summary of Findings

Table 8.1 highlights the key uses of social media by the EDMOs and the resources facilitating such uses and their capacities in harnessing these resources effectively. To achieve this, our analysis was guided by three theoretical frameworks: the STREMII model (Stewart & Wilson, 2015), DCV theory (Teece, 2007a) and RBT theory (Barney, 1991). By applying these theoretical lenses, we aimed to gain a holistic understanding of how the EDMOs leverage social media in their operations. We acknowledge that these theories, while valuable, may not cover every aspect of social media landscape within emergency and disaster management. Therefore, we adopted a hybrid approach, blending inductive and deductive methodologies. This hybrid approach allowed us to explore the multifaceted nature of the subject matter and identify a wide range of themes, ensuring that no critical insights were overlooked in the analysis.

Table 8.1 High Level Summary of EDMOs' Social Media Usage

<table>
<tr><th colspan="3">Social Media Use during Emergencies and Disasters</th></tr>
<tr><th rowspan="2">Communication</th><th colspan="2">Capabilities of EDMOs</th></tr>
<tr><th>Resources</th><th>Dynamic Capabilities</th></tr>
<tr><td>Information Gathering</td><td rowspan="5">Tangible</td><td rowspan="2">Sensing</td></tr>
<tr><td>Information Dissemination</td></tr>
<tr><td>Information Impact</td><td rowspan="2">Seizing</td></tr>
<tr><td>Internal Utilization</td></tr>
<tr><td>External Utilization</td><td rowspan="2">Transforming</td></tr>
<tr><td>Dialogic Communication</td><td rowspan="5">Intangible</td></tr>
<tr><td>Supporting Technologies</td><td rowspan="2">Ordinary</td></tr>
<tr><td>Handling Fake News</td></tr>
<tr><td>Social Media Challenges</td><td rowspan="2">Collaborative</td></tr>
<tr><td>Ethical Considerations</td></tr>
</table>

8.3 Social Media as a Communication Tool During Emergencies and Disasters

At the inception of the research, we laid the foundation for the study on the fundamental premise that social media holds the potential to serve as a valuable tool for emergency and disaster communication. However, what remained uncertain was the extent to which this

potential had been realized in practice. To address this critical knowledge gap, we sought to answer the overarching research question, *to what extent is social media currently and potentially used as a tool for emergency and disaster communication?* The answers to which would shed light on the degree to which social media is currently being utilized and could be further harnessed for effective emergency and disaster communication. Applying the STREMII model (Stewart & Wilson, 2015), DCV theory (Teece, 2007a) and RBT theory (Barney, 1991), and inductive-deductive insights brought up three major dimensions of social media usage for emergency and disaster communication which are *communication* (information gathering and dissemination), *social media resources*, and *capacities* of EDMOs. As we traverse this chapter, we will examine these dimensions of social media utilization for emergency and disaster communication, each guided by the aforementioned theories. These sections will not only illuminate the current practices but also uncover the potential opportunities and challenges that lie ahead in harnessing social media as a powerful instrument in managing and mitigating emergencies and disasters.

8.3.1 Information Gathering

The findings in this section show a significant role played by social media in the context of disasters and emergencies which helps in answering research sub-question one (In what ways can social media be used for gathering emergency and disaster information?). One of the primary functions that emerged prominently is information gathering. Social media platforms have proven to be invaluable tools for the EDMOs, as they actively engaged in monitoring these platforms to acquire critical intelligence and information during times of emergencies and disasters. The practicality of this information-gathering function was exemplified during two major events, namely the 2021 Accra floods and the COVID-19 pandemic. During both of these crises, the EDMOs recognized the need for real-time, up-to-date information to inform their decision-making processes, response strategies, and overall disaster management efforts. Social media emerged as a dynamic and responsive source of such vital information. The study revealed that the EDMOs exhibited a proactive approach to monitoring various social media platforms, thereby ensuring comprehensive coverage of the evolving situation during emergencies and disasters. This engagement with social media was not a passive endeavour; rather, it involved actively tracking and gathering information related to the unfolding events.

The findings showcase how the EDMOs leverage social media platforms for information gathering in disaster and emergency response using several strategies including *monitoring*

social media, expert opinions, indirect data collection, user-generated content, public engagement, identifying resource-stressed communities, risk assessment, real-time data analysis, assessment of damage, high-level information (raw data), eyewitness accounts, crowdsourcing, crowdsourced fundraising, crowdsourced supply collection, real-time needs assessment, and *ongoing monitoring and analysis.*

The EDMOs demonstrated a diverse range of data analysis techniques to extract meaningful insights from the social media data they collected. This showcases their adeptness in leveraging social media capabilities. These analytical approaches not only exemplify the organizations' proficiency but also contributes in addressing sub-question four (What are the current capabilities of the EDMOs to use social media?). *Content analysis* was utilized by EDMOs A, B, and D, involving manual content classification to categorize social media content based on its nature, enabling the distinction between requests for help, news updates, and fake news during the floods. Sentiment analysis, employed by EDMOs A and E, involved evaluating the emotional tone of posts to understand public sentiments surrounding the floods. *Network analysis*, adopted by EDMOs C and E, mapped social network connections to identify key influencers during the COVID-19 pandemic, enhancing the EDMOs' public campaign. *Time-series analysis*, applied by EDMOs A and C, tracked the evolution of discussions and trends over time, offering insights into the changing public attitude toward the COVID-19 vaccination. *User profiling*, engaged in by EDMO E, created profiles of key users contributing relevant information on social media, aiding in credibility assessment and source prioritization. Additionally, EDMO A *conducted multimedia* analysis by analysing images and videos shared on social media platforms, focusing on gaining situational awareness, assessing damage, understanding resource needs, and comprehending the overall impact of the disaster. These diverse data analysis techniques showcased the EDMOs' approaches in extracting meaningful information from social media to enhance their disaster management strategies. The EDMOs also demonstrated adaptive approach to information management, leveraging a combination of technological tools and strategic methodologies. This included harnessing the power of hashtags, employing diverse search terms, utilizing advanced filtering mechanisms, and incorporating verification processes. While challenges and considerations exist, the nature of their strategies reflects a commitment to ensuring the accuracy, relevance, and reliability of information in emergency response efforts.

Importantly, the EDMOs displayed flexibility in their choice of social media platforms for information gathering, which varied across different phases of disaster management. The two platforms that stood out as the most extensively utilized for this purpose were Facebook, followed closely by X (Twitter). These platforms offered a rich repository of real-time information, which were crucial for the EDMOs to assess the gravity of the situation and tailor their responses accordingly. The findings not only exemplify the practical utility of social media but also underscore its significance as a valuable resource for the EDMOs, particularly for information gathering during emergencies and disasters. It highlights the adaptability and responsiveness of these organizations in leveraging the potential of social media platforms to enhance their situational awareness and decision-making capabilities.

The findings in this section are directly related to the first construct in the STREMII model (Stewart & Wilson, 2015)— *surveillance and social listening*— as used in this study. Stewart and Wilson (2015) argue that social media is a particularly important resource for monitoring extreme events. Extreme events are often unpredictable and can quickly escalate, making it important for organizations to be able to monitor the situation closely. Social media can provide organizations with real-time insights into how the public is reacting to an extreme event, as well as identify any potential threats or areas of concern. However, the STREMII model emphasises on the monitoring aspect of social media while this research provides more perspectives on the functions of social media as *information gathering* tool.

The extant body of research provides further support for the significance of the findings we have uncovered. Numerous studies conducted across various contexts and regions have consistently corroborated the key role that social media plays in disaster and emergency management (Ingrid et al., 2020). These studies collectively reinforce the notion that social media is not just a supplementary tool but a critical and integral component of modern disaster response and preparedness strategies. The adaptability and responsiveness of EDMOs in leveraging social media platforms align with a broader trend observed in disaster management practices (Benjamin, et al. 2021). Organizations are increasingly recognizing the need to adapt to the evolving information landscape, where social media has emerged as a primary source of real-time data (Kraus et al., 2021). This adaptability signifies a proactive approach in embracing technological advancements and harnessing the potential of social media for the greater good of disaster-affected communities (AlHinai, 2020). Furthermore, the research findings underscore the dynamic nature of disaster management in the digital age. The ability

to gather timely information from social media platforms enables the EDMOs to make informed decisions rapidly, thereby facilitating more efficient and targeted response efforts. This is particularly critical in situations where every moment counts, such as during disasters, disease outbreaks, or other unforeseen emergencies (Benjamin, et al. 2021). From the research findings and insights from extant body of research, we suggest the following proposition (This and subsequent propositions essentially encapsulate the research findings):

Proposition 1:	*In times of emergencies and disasters, social media emerges as a dynamic and responsive information resource.*

8.3.1.1 Handling Misinformation

Misinformation involves deliberately created narratives with the intent to mislead or deceive the general public. In the context of disasters, the spread of misinformation has the potential to amplify the challenges faced by both communities and disaster response efforts. The swift propagation of misinformation, rumours, fake news and hoaxes can create confusion, provoke panic, and hinder the effectiveness of disaster management actions. Consequently, it is important to address the problem of misinformation and counteract its negative consequences when gathering information in disaster situations. The research findings underscored the prevalence of misinformation and fake news during the COVID-19 pandemic and the Accra floods across various social media platforms. This revelation sheds light on the capabilities of the EDMOs in addressing these challenges. Although not initially a focus of the study on EDMOs' social media capabilities, it provided valuable insights into their capability to combat misinformation. This partially addresses sub- questions four and five (What are the current capabilities of the EDMOs to use social media? *and* how could their capabilities be increased?).

The diffusion of inaccurate information led to a concerning situation in which individuals formed misguided judgments based on unreliable sources. The impact of misinformation during the Accra floods was particularly pronounced due to its quick circulation, intensifying the existing challenges and further complicating the overall confusion and chaos surrounding the incident. In one instance, there was a manipulated image circulated on Facebook, purporting to show a severely flooded area in Accra. However, it was later revealed that the image was actually from a completely different location, leading to a distorted perception of the true extent of the flooding in Accra. This false representation induced panic and unnecessary concern among residents. Another example involved individuals editing or sharing old footage of previous floods and falsely attributing them to the current event. These

misleading visuals distorted public perception and hindered an accurate assessment of the actual impact and scale of the flood. Similar cases of misinformation arose during the COVID-19 pandemic. As indicated by the research findings, the widespread dissemination of misleading information and fake news regarding COVID-19 treatment resulted in misguided responses among the general population. Furthermore, the promotion of conspiracy theories about the origin of COVID-19 has contributed to public confusion and undermined confidence in public health protocols and vaccination efforts. Misinformation has the potential to disrupt the system, leading the EDMOs in the wrong direction and leaving people awaiting aid that never materializes, misallocating resources, and creating further distress and delays in actual relief efforts. These findings align with those of Fraustino (2020) who also observed similar adverse effects of misinformation in emergencies and disasters. Misinformation can severely harm lives and exacerbate the extent of devastation.

Acknowledging the significant influence of misinformation on response efforts emphasizes the necessity for proactive strategies. The research results illustrate the diverse strategies adopted by the EDMOs to counteract the impact of misinformation in disaster situations, showcasing their effective capabilities in this regard. These strategies involved a range of methods used by the EDMOs in the particular disaster situations they confronted. One of the strategies used by the EDMOs to counter the dissemination of misinformation entailed monitoring of information sources and engaging actively with the public. The EDMOs have acknowledged the importance of remaining attuned to the communication channels and taking steps to interact with the public, delivering accurate information. By closely monitoring social media platforms, news sources, and other information outlets, the EDMOs were able to identify and address instances of misinformation. This approach allowed them to detect false narratives and rumours as they surface, effectively preventing the spread of inaccurate information. The EDMOs also actively engaged with the public via social media. This interaction enabled the EDMOs to directly address concerns, clear up uncertainties, and furnish authoritative information to counteract the impact of misinformation. While the practice of directly engaging with the public via social media to counteract misinformation is commendable, it is not sufficient on its own to establish the truthfulness of information. Effective verification should go beyond online discourse and include direct, on-the-ground investigations that gather physical evidence. For instance, using drones to monitor flood-affected areas or deploying officers to collect data on vaccine effectiveness are more robust methods of verification. These approaches allow for the collection of tangible evidence that can substantiate or refute claims made online, ensuring that

the information shared with the public is accurate and reliable. By combining social media engagement with rigorous, evidence-based investigations, disaster management organizations can build greater public trust and enhance the credibility of their interventions.

In their quest to combat the spread of misinformation, the EDMOs established a dedicated social media account. These platforms served as reliable sources of accurate and current information on the emergencies and disasters. Another effective approach utilized by the EDMOs to counter misinformation involved collaboration with local television and radio news networks. This collaboration functioned as a means for delivering accurate information to the public, leveraging the outreach and credibility of established media platforms. Additionally, collaborating with social media influencers has proven to be a successful strategy adopted by the EDMOs to mitigate the spread of misinformation. This approach harnessed the popularity and wide-reaching impact of influencers on various social media platforms to distribute accurate information during the Accra floods and COVID-19 pandemic, thus mitigating the effects of misinformation.

Based on the insights derived from our research findings, we present a conceptual model designed to illustrate potential approaches for tackling misinformation on social media, as illustrated in Figure 8.1. This model, named the S3M model (Social Media Misinformation Management Model), serves as a valuable framework. It offers a visual representation of various strategies and actions that can be employed to disseminate accurate information, ultimately mitigating the detrimental effects of misinformation and enhancing disaster response efforts. The implementation of the S3M model has the potential to augment the capabilities of EDMOs, contributing to more effective and informed decision-making in crisis situations.

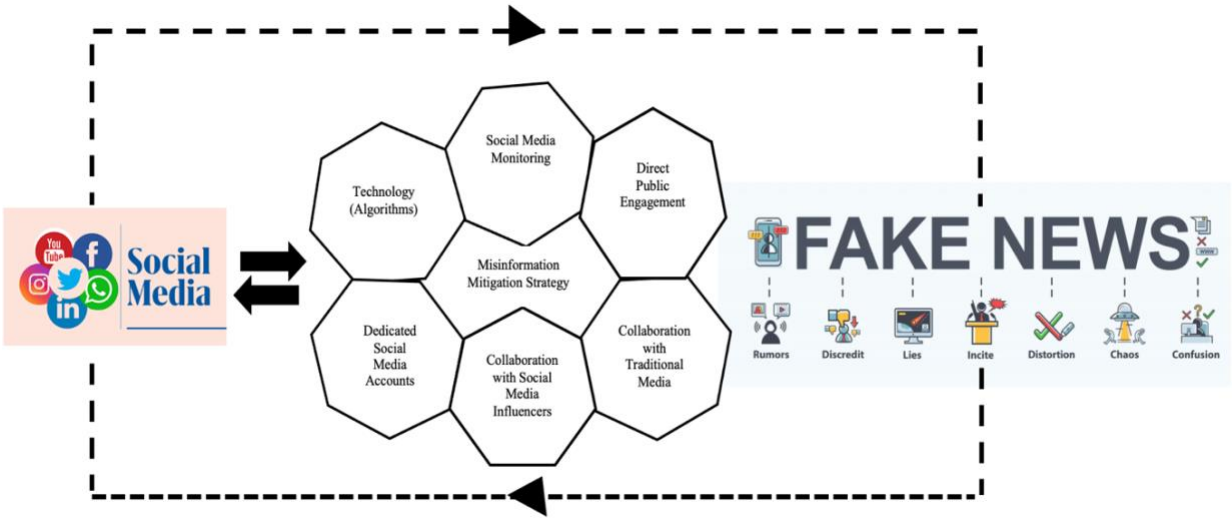

Figure 8.1 Proposed S3M Model

An observation worth noting is that the EDMOs were yet to incorporate technology into their approaches for addressing the challenge of misinformation. In an era where technological advancements are instrumental in various aspects of communication and information management, the absence of such tools within the EDMOs' misinformation mitigation approach is a significant aspect. This prompts consideration of the potential advantages that advanced technologies, such as automated fact-checking algorithms or real-time information verification systems, could offer in effectively countering the dissemination of false or misleading information during disaster situations. The integration of technology-driven solutions aligns with the ongoing developments in communication strategies (Van Veldhoven & Vanthienen, 2022) and could offer the EDMOs a more efficient means to combat misinformation during emergencies and disasters. By making use of real-time information verification systems, as discussed by Moez et al. (2024), organizations can enhance their ability to ensure the accuracy of information conveyed to the public. Furthermore, employing algorithms to evaluate the credibility of sources, as explored by Saman, Firouzeh and Holger (2023), has the potential to contribute to establishing and maintaining public trust in the information provided by organizations.

8.3.1.2 Ethical Considerations

The availability and implementation of ethical standards play a key role in safeguarding private data on social media. The findings of the study reveal that, two out of the five EDMOs had not only recognized the significance of ethical guidelines during information gathering but had successfully integrated them as a fundamental component of their operational framework.

These ethical guidelines served as a set of principles and standards that governed their conduct on accessing and sharing private data. The ethical issues— *privacy and anonymity*, *informed consent*, and *confidentiality*— identified in the studies of Makela (2015) and Townsend and Wallace (2016) were used to assessed their ethical practice. The findings show that the EDMOs upheld the principles of *privacy and anonymity*, underscoring their commitment to safeguarding these aspects of ethical conduct. An illustrative case occurred during the COVID-19 lockdown, where a Facebook post featured two individuals suspected of involvement in a criminal activity while their identities were deliberately concealed, and their faces were obscured. This deliberate omission of names and facial concealment by EDMO E effectively preserved the suspects' anonymity. This practice served the dual purpose of protecting their privacy and preventing hasty judgments or potential stigmatization related to their involvement in the investigation. EDMO C's operations also exemplified a similar commitment to maintaining privacy and anonymity. This commitment was prominently evident in their Facebook and X (Twitter) accounts. Specifically, when disseminating information about the daily statistics of COVID-19 infection rates, they took a great care to avoid revealing any personal information, such as the names of those affected or the organizations involved.

Research studies have emphasized the importance of privacy and anonymity when it comes to the collection and sharing of private and sensitive data on social media platforms especially during emergencies and disasters. These studies highlight the critical role that safeguarding individuals' personal information and ensuring their anonymity plays in maintaining the ethical and responsible use of social media data. Ethical principles dictate that individuals affected by emergencies and disasters should be treated with respect and dignity (Mena & Hilhorst, 2022). This includes safeguarding their privacy and anonymity, as undue exposure can lead to stigma, discrimination, or even targeted scams and fraud. During crises, various organizations use social media to coordinate responses and disseminate important information and research has demonstrated that the responsible handling of private data on social media is vital for maintaining public trust and ensuring the effectiveness of these response efforts (Lochner et al. (2020).

Although we recognize the inclusion of the other two ethical issues, namely *informed consent* and *confidentiality*, in the EDMOs' ethical guidelines, fully assessing the adherence to these standards would necessitate a more comprehensive research endeavour. We had earlier thought that these two ethical issues could be covered by the research, regrettably, we realized during

data collection that such an investigation is beyond the scope of the research (This demands access to specific cases, extensive documentation and direct observation of operational practices). Nevertheless, the findings revealed areas in which the EDMOs could improve their ethical practices potentially helping to increase their capabilities in using social media thereby contributing in answering sub-question five (How could their capabilities be increased?). The EDMOs should consider being more open and transparent about their ethical guidelines, especially in terms of how data is handled. Openness can enhance trust and ensure data subjects and stakeholders have a clear understanding of the organization's practices. They also need to work on improving internal communication and awareness about their ethical guidelines. This can be achieved through regular training, workshops, and clear communication of these guidelines to all staff members. Again, they should consider establishing clear accountability mechanisms and consequences for unethical behaviour. This step ensures that individuals and teams are held responsible for their actions, promoting adherence to ethical standards and a culture of accountability within the organizations. Incorporating these improvements can help the EDMOs enhance their ethical standards, foster trust among stakeholders, and ensure a more consistent and responsible approach to data management and ethics.

8.3.2 Information Dissemination

The research findings shed light on the information dissemination behaviour of the EDMOs. This exploration provides a valuable understanding of how the EDMOs go about sharing information with the aim of efficiently managing various types of disaster events. Such insights serve as an essential contribution to the enhancement of disaster management practices and the optimization of overall disaster management efforts. The gained insights are particularly instrumental in addressing sub-question two (How is information disseminated by the EDMOs during emergency and disaster events?).

Within the field of disaster management, the primary objective is to implement measures that effectively mitigate the impact and potential harm caused by a diverse range of disasters. Central to this goal is the aspect of disseminating critical information and knowledge to relevant stakeholders. The EDMOs play a vital role in facilitating the flow of essential information related to potential hazards, vulnerabilities, and effective mitigation strategies. The response to the floods impacting the coastal areas of the Greater Accra region and the management of the COVID-19 pandemic serve as notable examples underscoring the significance of information sharing by the EDMOs. In these crises, the EDMOs exhibited a

proactive approach, employing a multifaceted array of strategies. These included the strategic use of *hashtags* to enhance information visibility, the dissemination of *safety guidelines* to empower communities, *geolocation tags* for precise targeting, *timely updates* to keep the public informed, *multimedia content* for engaging communication and interaction, *directing individuals to relevant health resources*, *motivation of health-promoting behaviours*, *social mobilization* for collective action, the *presentation of success stories* to inspire, and *addressing critical issues head-on*. These strategies employed by the EDMOs exemplify their dedication to effective communication, ensuring that the public is well-informed and empowered to navigate crises with resilience. As such, we present the following proposition to encapsulate the information-sharing activities of the EDMOs and their influence on disaster management.

Proposition 2:	*Information dissemination by disaster management organizations cultivates a sense of engagement and solidarity within affected populations and stakeholders, leading to more effective disaster management efforts.*

The concept of responding to a crisis and engaging in conversation, as outlined in the STREMII model (Stewart & Wilson, 2015), aligns with the research findings in various ways. However, it is important to note that while the STREMII model provides valuable insights into crisis response and communication, it did not explicitly state details or findings that align with specific research outcomes. While the STREMII model provides a theoretical framework and guiding principles for incorporating social media into emergency management, specific research studies, such as this study, might offer more detailed and context-specific findings related to the practical implementation and outcomes of social media engagement during crises.

8.3.3 Information Dissemination Impact

This section seeks to address sub-question three (How did the disseminated information impact on emergency and disaster risks management?). Social media offered a seamless channel for the EDMOs and affected communities to connect effectively during the Accra floods and COVID-19 pandemic. This active exchange of information proved to be extremely valuable, allowing the EDMOs to share essential updates and enabling affected communities to inquire, gain clarity, and voice their concerns. In turn, the EDMOs were able to respond promptly to these inquiries. This open and responsive communication platform fostered a supportive atmosphere, providing aid and guidance to individuals affected by the two crises.

One key function of the EDMOs when utilizing social media during emergencies and disasters is the identification and swift response to the needs of affected communities. This proactive

engagement involves disseminating crucial details about the relief resources and assistance that are at their disposal. This approach goes beyond just information sharing; it actively serves as a catalyst for forging connections between individuals in distress and potential volunteers or donors, thus streamlining the overall relief process. By employing social media as a dynamic platform for communication and outreach, the EDMOs are not only able to convey the availability of essential aid but also to pinpoint specific requirements within the affected communities. This targeted response ensures that the right help reaches those who need it most, and in a timely manner. The seamless interaction on social media platforms serves as a bridge between the EDMOs and the communities in crisis, fostering a sense of unity and collaboration in the face of adversity. This approach ultimately contributes to more efficient disaster response efforts, potentially saving lives and minimizing the impact of emergencies and disasters on affected individuals and their communities.

The consistent use of the *#AccraFloods* hashtag as a strategy for sharing information had a significant impact on shaping public behaviour. The collective adoption of this hashtag, particularly by EDMOs A, B, and D, functioned as a unifying symbol for the community, fostering a sense of solidarity and shared responsibility in dealing with the aftermath of the floods. The information shared by the EDMOs also played a big role in the post-flood recovery phase, particularly in coordinating volunteer clean-up initiatives and initiating fundraising campaigns. By means of event notifications and announcements, the EDMOs effectively harnessed the collective power of social media to mobilize support, gather resources, and encourage active engagement from the community. Also, throughout the COVID-19 pandemic, the information provided by the EDMOs played a crucial role in enhancing public awareness regarding the virus, its potential risks, and the significance of preventive measures. The EDMOs disseminated information in various formats, including graphics, videos, and written content. This multimedia approach aided in conveying key concepts in an easily digestible manner, ensuring that the general public could comprehend the seriousness of the situation. By utilizing social media, the EDMOs ensured that this disseminated information reached a diverse audience, including those residing in remote areas with limited access to traditional media channels. Furthermore, the information shared on social media platforms served as a link to important health resources. Links to official websites, helpline numbers, testing centres, and vaccination sites were widely distributed, enabling individuals to access services and support they needed. Consequently, the information disseminated by the EDMOs played a key role in shaping public opinion and increasing awareness about the pandemic.

While we have delved into the impact of information dissemination from the perspective of the EDMOs, it is equally important to emphasize the necessity for further research to investigate this impact from the viewpoint of the public, particularly the affected communities. However, existing studies have shed light on the potential influence of disseminated information on social media. These studies have shown the ways in which information disseminated on social media shape public opinion. For instance, Al-Dmour et al. (2020) opine that the information provided on social media helps individuals comprehend the risks they face and the measures they should take to protect themselves and their communities during emergencies. Moreover, the psychological impact of such information cannot be underestimated. During crises, people often experience anxiety, fear, and uncertainty. Accurate and easily accessible information can alleviate these emotions by offering a sense of control and understanding (Brenda, 2020) and it provides a lifeline of guidance in times of emergencies, empowering individuals to make informed decisions (Nayomi, Tan & Ashantha, 2020). Based on the research findings, we present the following theoretical proposition.

Proposition 3:	*Information disseminated by disaster management organizations on social media plays a key role in shaping public opinion and increasing awareness during emergencies.*

8.3.4 Supporting Technologies

Efficient emergency and disaster management is dependent on disaster communication which involves two aspects: information gathering and dissemination. To enhance their communication strategies, the EDMOs have integrated non-traditional social media platforms alongside the established ones such as Facebook and X (Twitter). This helps in addressing sub-question four (what are the current capabilities of the EDMOs to use social media?) by revealing the integration of non-traditional social media platforms alongside mainstream ones, showcasing EDMOs' awareness of the limitations and challenges associated with relying solely on conventional platforms.

Although social media plays a crucial role in disaster communication, it comes with inherent limitations, particularly during disruptions such as unstable power or low bandwidth. In response to these challenges, the EDMOs have proactively diversified their communication strategies. They acknowledge that depending solely on mainstream social media platforms is insufficient, especially when these platforms may become inaccessible or unreliable during emergencies. Consequently, they have broadened their sources and techniques for information

gathering by integrating non-traditional social media platforms into their management practices.

The implementation of websites for public engagement, as illustrated by EDMO D, proved effective in providing diverse channels for communication. This approach not only facilitated distress calls but also encouraged active public participation, creating an inclusive and collaborative environment. Emails and phones emerged as key tools for swift and efficient communication, especially within the EDMOs' teams. The flexibility of emails and phone calls, as highlighted by EDMO C, is evident not only in external communication but also in internal coordination among team members. The integration of SMS, particularly by EDMO B, demonstrated resilience in information dissemination efforts, functioning effectively even in challenging conditions with low bandwidth. During the COVID-19 pandemic, EDMO C successfully implemented the GH COVID-19 Tracker App, showcasing the integration of technology for data collection and contact tracing. This downloadable software, utilizing telephone-related data, proved instrumental in tracking the movements of infected individuals, contributing significantly to the management of the pandemic. The EDMOs also recognized the importance of a multi-channel strategy for information dissemination, incorporating traditional mass media outlets such as television and radio. Despite the dominance of social media, these traditional channels remain crucial, particularly in situations where social media platforms may be inaccessible or unreliable.

Radio communication devices and drones played a pivotal role as supporting technologies, offering reliable alternatives when primary communication channels faced challenges. Radios, serving as a backup to mobile phones and social media, ensured continuity of information flow. Drones, as employed by EDMO A, showcased their versatility in various roles, from disinfection exercises to the swift transportation of essential items, demonstrating their potential in emergency and disaster management. While the EDMOs effectively utilized several supporting technologies, the absence of GIS and IoMT in their strategies is noteworthy. GIS could enhance spatial data analysis, real-time situational awareness, and mapping for decision support, while IoMT devices could contribute to remote health monitoring, especially in health emergencies like COVID-19.

Many social media communication models have traditionally focused on the core principles of engagement, information dissemination, and community interaction. However, they have often failed to delve into the crucial aspect of supporting technologies, especially during disruptions

that are prevalent during emergency and disaster situations. This gap in knowledge represents a significant oversight, as it is during these very disruptions that effective communication can be a matter of life and death. By exploring the vital role that supporting technologies can play in disaster communication, our research seeks to address this shortfall. In times of disasters and emergencies, traditional social media platforms may be unreliable or unavailable, supporting means such as phone calls, radios, SMS, websites, and emails become lifelines for maintaining contact and sharing essential information. By investigating how these supporting technologies can seamlessly integrate with social media frameworks like the STREMII model, this study offers a more detailed understanding of disaster communication. As shown in the findings, these supporting technologies can bridge communication gaps, ensure continuity of communication, and support the overarching goals of disaster management, ultimately enhancing the resilience of communities and the EDMOs in times of emergencies and disasters, hence, we propose the following theoretical statement.

Proposition 4:	*During disasters and emergencies, the successful implementation of supporting technologies ensures uninterrupted communication, reducing the vulnerability of social media platforms.*

8.3.5 Social Media Challenges

The findings show that social media offers the EDMOs numerous advantages for gathering and disseminating emergency and disaster information, However, it is important to acknowledge that they also face specific challenges when it comes to effectively utilizing these platforms. These challenges are summarized in Table 7.2 in chapter seven.

The EDMOs faced challenges in harnessing the power of social media during crises. The issue of *information overload* loomed large, as the surge of data overwhelmed the EDMOs during the two crises, demanding meticulous efforts to navigate through vast amounts of information, distinguish credible sources, and ensure the prompt sharing of accurate information. The spread of *misinformation* further complicated matters, necessitating proactive measures to counter false narratives and provide the public with reliable updates. *Real-time monitoring* across diverse social media platforms became a complex task, given the challenge of managing multiple channels simultaneously, underscoring the need for dedicated resources and strategic approaches. The limitation of *reach and accessibility* on social media platforms raised concerns about excluding certain populations, prompting the EDMOs to adopt inclusive communication strategies alongside their social media efforts. The *platform-specific* challenges highlighted the necessity of tailoring communication strategies to the unique features of each platform,

acknowledging factors such as X (Twitter)'s character limit and Facebook's allowance for more detailed updates. The challenges of *low bandwidth*, *network failures*, and *power outages* posed significant disruptions, affecting the EDMOs' ability to coordinate and disseminate critical information during emergencies. Additionally, *budgetary constraints* add another layer of complexity, requiring careful resource allocation and advocacy for increased funding to optimize the potential of social media platforms for effective emergency and disaster response. Despite these challenges, the EDMOs recognize the crucial role of social media and continue to adapt their strategies, leveraging supporting technologies and adopting comprehensive approaches to enhance their resilience during emergencies and disasters.

8.3.6 Internal vs External Utilizations

The research findings have revealed a significant dimension in the social media strategies of the EDMOs, highlighting their utilization of social media for both internal and external communication purposes. This finding contributes to existing research studies and social media models, which have emphasized the external applications of social media by organizations, neglecting the internal dimensions. The STREMII model (Stewart & Wilson, 2015), used in this research for instance, predominantly addresses the optimization of social media for external communication, such as crisis updates, public engagement, and public relations. However, our research shows an important and under-researched aspect of the role of social media for internal communication in organizations. While external communication undoubtedly remains vital for emergency and disaster management, our findings demonstrate that social media is equally effective in facilitating internal communications within the EDMOs.

In times of emergencies and disasters, the efficient flow of information and coordination among internal teams is paramount. The EDMOs rely on seamless communication to manage resources, personnel, and crisis response strategies effectively. This research reveals that social media, particularly WhatsApp, played a big role in supporting these internal communication needs. It served as a platform for disseminating critical updates, sharing vital information, coordinating emergency response efforts, and fostering collaboration among various teams and departments within the EDMOs. The STREMII model, despite its widespread adoption and success in guiding organizations in enhancing external communication, may benefit from an expansion of its scope to include the internal communication aspects. Our research findings suggest that a holistic approach, which considers both internal and external utilization of social

media, is essential for comprehensive and effective disaster management, hence we present the following theoretical proposition.

Proposition 5:	*The use of social media for internal communication during emergencies and disasters improves coordination and information sharing within disaster management organizations, ultimately leading to more effective response efforts.*

8.3.7 Dialogic Communication

Dialogic communication is a communication approach that emphasizes a two-way exchange of information. It encourages active engagement, open and collaborative dialogue, and a genuine willingness to listen. This approach fosters an environment where participants feel motivated to pay close attention and, at the same time, create a welcoming atmosphere that invites others to express their thoughts and ideas (Huisman et al., 2019). Dialogic communication is not just about one-way transmission of information but rather a dynamic interaction between communicators.

The study's findings revealed that the EDMOs effectively employed dialogic communication during critical events like the Accra floods and the COVID-19 pandemic. Specifically, platforms such as Facebook and Twitter played significant roles in enabling the EDMOs to disseminate real-time updates and safety information to the affected communities. During the Accra floods, these platforms became a hub for sharing crucial information. The EDMOs provided updates on the situation, offering vital guidance to the public. Simultaneously, individuals affected by the floods used these platforms to ask questions, seek assistance, and share their personal experiences. This reciprocal exchange of information created a space for community engagement, mutual support, and a shared understanding of the crisis. In the context of the COVID-19 pandemic, dialogic communication strategies were again employed by the EDMOs to address vaccine hesitancy. Instead of merely broadcasting information, the EDMOs actively engaged with the public. They took the time to listen to people's concerns, anxieties, and misconceptions regarding the vaccines. This active listening allowed the EDMOs to better understand the public's perspective and tailor their responses to address these concerns effectively. Moreover, the EDMOs provided accurate and trustworthy information, dispelling myths and misconceptions about COVID-19 vaccines. By employing dialogic communication principles, they built trust with the public, establishing themselves as reliable sources of information. This trust was instrumental in encouraging responsible actions, such as

vaccination, during the pandemic. Our research findings suggest that the effectiveness of emergency and disaster management experiences significant improvement when organizations actively participate in two-way communication with the public on social media. Consequently, we posit the following theoretical proposition:

Proposition 6:	*Dialogic communication, characterized by active engagement with the public on social media, enhances an organization's ability to respond to crises.*

The use of dialogic communication principles in the context of the Accra floods and the COVID-19 pandemic illustrates the power of open, two-way communication. This approach facilitates the efficient dissemination of information and builds trust, fosters community engagement, and helps address public concerns, making it a valuable tool for crisis management and public health communication. While several researchers have delved into the ways organizations employ social media, particularly during disaster events, the predominant focus has revolved around the one-way communication aspects of these platforms. These studies have viewed social media as channels primarily designed for broadcasting information and influencing public behaviour during crises. Examples of such studies include Dong et al. (2021) and Widyastuti (2021). However, the findings in this research challenge this conventional perspective by shedding light on the equally, if not more, critical role of two-way communication in the realm of emergency and disaster management. Our research findings emphasize the importance of incorporating the aspect of two-way communication. This emphasis not only provides organizations with a new perspective but also equips them with the capabilities to respond swiftly to public inquiries, concerns, and feedback, which is particularly crucial in emergency or disaster situations where real-time responses are often necessary. Recognizing the potential of harnessing two-way communication on social media is of utmost importance when it comes to advancing the field of emergency and disaster management. While prior studies have undoubtedly provided valuable insights into the way information is disseminated via social media platforms during times of crisis, it is essential to acknowledge that this understanding can be significantly amplified by fully embracing the dynamic and interactive nature of social media. In this continually evolving landscape, the ability to engage in open, two-way communication stands out as a key strategy that the EDMOs should wholeheartedly adopt. This strategy can potentially empower them to disseminate critical information during emergency and disaster situations while connecting them with the communities they serve on a deeper level. The shift toward two-way communication signifies

a departure from the traditional top-down approach to emergency and disaster management especially in the African context, where information flows from authorities to the public. Instead, it allows for a more reciprocal and participatory exchange of information and feedback. By actively engaging with the community, organizations can create a stronger sense of trust and collaboration, which are fundamental during crisis situations.

8.3.8 Revisiting the STREMII Model

The STREMII model, as detailed in chapter five, comprises six phases and serves as a framework for handling crisis communication on social media. This model, developed by Stewart and Wilson (2015), has found usefulness among organizations seeking to navigate their social media engagement during crises. It stands as a valuable resource for entities in the process of formulating their crisis communication strategies on social media. Nonetheless, it is essential to acknowledge that our research findings align with and support the previously identified limitations in the model, notably those articulated by Bukar et al. (2020) and Stewart and Young (2018). The primary concern revolves around the model's inherent linearity. The prescribed phases within the STREMII model seem to offer a rigid sequence of steps that should be followed in a linear fashion. However, the reality of managing crises, particularly within the context of emergency and disaster scenarios, is far from being as structured and sequential as this model implies. These events often unfold with unpredictable situations, necessitating an agile and adaptive approach for the formulation of communication strategies. Furthermore, the model falls short in adequately addressing the pressing issue of misinformation. Misinformation has the propensity to propagate rapidly on social media channels, and organizations need to be well-prepared to tackle and rectify it. Unfortunately, the STREMII model does not provide sufficient guidance on how to discern and debunk misinformation effectively. An additional concern with the STREMII model lies in its exclusion of supporting technologies. In today's digital landscape and especially in the African context, the role of supporting technology is indispensable for effective crisis communication. The model does not account for the tools or platforms that can significantly aid organizations when disruptions occur on social media. Addressing these limitations and adapting the model to align with the real-world challenges posed by emergency and disaster communication on social media will be pivotal in its continued relevance and effectiveness, hence, adapting from the STREMII model, we propose a new model and we name it as *Emergency and Disaster Communication* (EDC) *Model,* which is illustrated in Figure 8.2.

In contrast to the STREMII model, the proposed EDC model diverges from a linear approach while expanding the communication strategies and comprises six distinct phases, each serving a unique purpose:

- *Social Listening:* This initial phase involves actively monitoring social media platforms to identify conversations, posts, and content related to a disaster. It involves several information gathering strategies which has been summarized in Table 6.7 in chapter six.

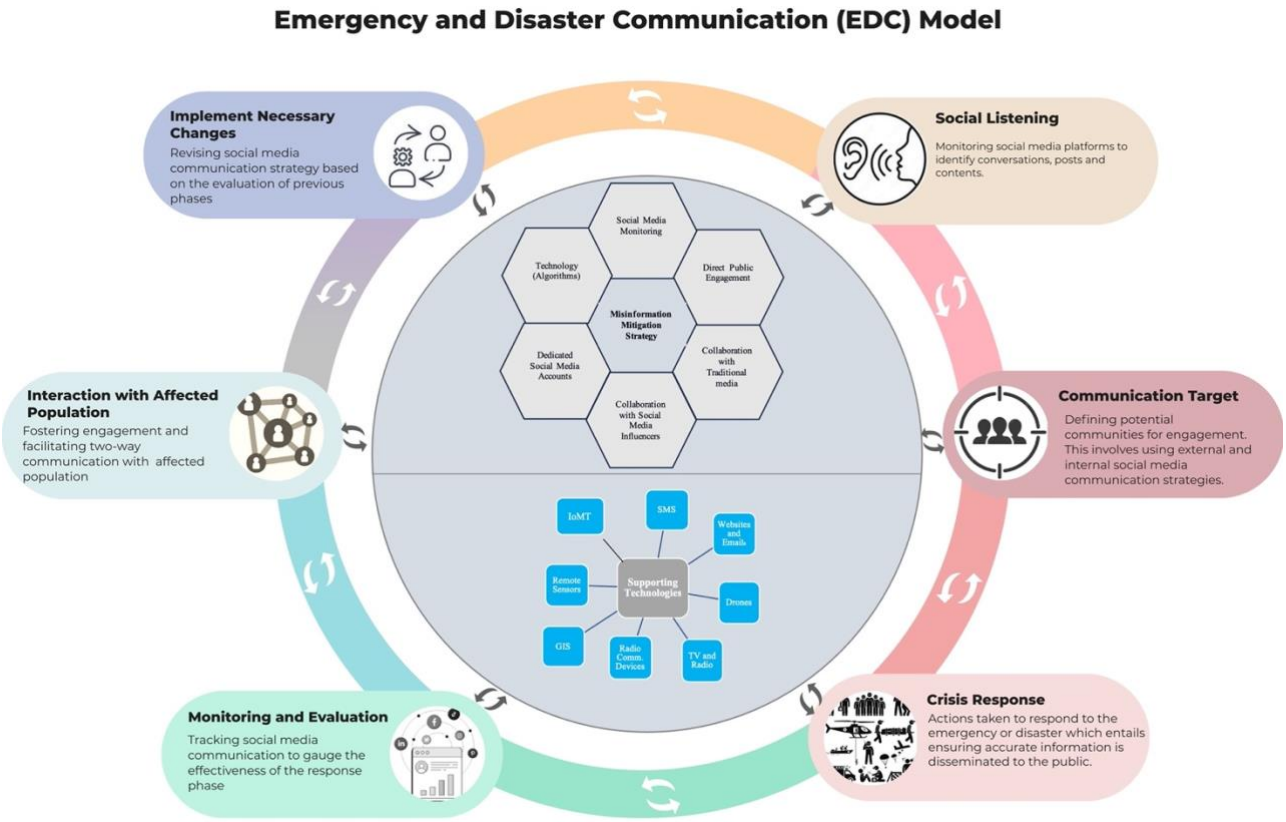

Figure 8.2 The EDC Model (our proposed model)

- *Communication Target*: Once the social listening phase has provided insights, the next step is to narrow down and define the specific audience or community for engagement. This involves using external and internal strategies for managing the crisis. Table 6.9 in chapter six summarizes the key points from the external and internal utilization of social media in the context of targeting the appropriate audiences.
- *Crisis Response*: In this phase, immediate actions are taken to respond to the disaster which entails ensuring that accurate and timely information reaches the public, aiding in decision-making, awareness, and response coordination. Table 6.10 in chapter six provides a summary of diverse strategies relevant in this phase.

- *Monitoring and Evaluation*: Concurrently with the disaster response phase, monitoring and evaluation are ongoing processes. It involves continually tracking social media communications to gauge the effectiveness of the response phase. Here, the response efforts are assessed to know whether they are addressing the needs of the affected community.
- *Interaction with Affected Population*: Building upon the insights gathered from the monitoring and evaluation phase, this stage emphasizes two-way communication with the affected community. The affected community is engaged to answer their questions, provide updates, and gather feedback. This interaction helps in building trust and allows for the dynamic adjustment of response strategies based on real-time feedback.
- *Implement Necessary Changes:* The final phase is about using the feedback and data collected during the previous stages to adapt and refine the social media communication strategy. This involves changes in the messaging, the channels used for communication, and the allocation of tangible and intangible resources. It ensures that the response remains relevant and effective throughout the evolving emergency and disaster situation.

The proposed model contributes in addressing sub-question five (How could their capabilities be increased?) and provides a more dynamic and adaptable framework for managing and responding to emergencies and disasters through social media, taking into account the evolving nature of disasters and the importance of fighting misinformation and the use of supporting technologies while engaging with the affected communities.

8.4 Capabilities of EDMOs

The research findings shed light on the competencies of the EDMOs when it comes to effectively using social media in times of emergencies and disasters. These capabilities are explained in the subsequent sections, and they are scrutinized through the lenses of the DCV theory (Teece, 2007a) and RBT theory (Barney, 1991) with the overarching objective to address sub-questions four and five (what are the current capabilities of the EDMOs to use social media? and how could their capabilities be increased?).

The DCV and RBT theories provided a framework for assessing how the EDMOs leveraged their internal resources and capabilities to adapt and respond to the dynamic and unpredictable nature of social media during crisis situations. By analysing the research findings within the context of these theories, we gained a deeper understanding on how the EDMOs harness their resources, such as technology, personnel, and protocols, to effectively manage their social

media communication. This examination also allowed us to appreciate how the EDMOs develop dynamic capabilities to stay agile and responsive in an ever-evolving digital landscape.

8.4.1 Social Media Resources

The successful utilization of social media platforms during emergency and disaster situations relies on a range of critical resources that play key roles in shaping communication strategies and achieving desired outcomes. Drawing from the RBT theory, it posits that the primary determinants of an organization's performance are its internal resources and capabilities, rather than its position within a particular industry or market. When applied in the context of this research, it becomes evident that the performance of the EDMOs in the realm of social media hinges on their social media-specific resources and capabilities. The research findings from this study have revealed that the EDMOs deployed two distinct categories of resources to achieve their desired communication outcomes: *tangible resources* and *intangible resources*. These resources, summarized in Table 8.2, are at the core of their communication strategies and are instrumental in enabling them to effectively harness the power of social media during emergency and disaster situations.

Table 8.2 Resources Facilitating Effective Communication in the EDMOs.

Social Media Resources for Disaster Management	
Tangible Resources	Intangible Resources
• Computers (Desktops/ laptops) • Smart Phones • Tablets • Social Media Personnel • Internet Connectivity • Social Media Management Tools • Monitoring and Analytics Tools	• Social Media Skills • Collaborative Networks • Expert Knowledge • Protocols and Guidelines • Adaptive Learning and Training Culture

Tangible resources are the physical assets, infrastructure, and material components the EDMOs rely on to enhance their communication efforts in times of emergencies and disasters. All the EDMOs were equipped with and made effective use of various hardware tools that played a critical role in facilitating communication during the Accra floods and COVID-19 pandemic even though the findings also highlighted a deficiency in the utilization of social media management tools by the EDMOs and a lack of enough computers, smart phones, and social media personnel. Social media management tools are essential for optimizing the

administration of social media platforms. They provide functionalities like scheduling content, conducting analytics, monitoring, and analysing sentiment, all of which improve social media operations and assess the effectiveness of communication efforts. Indeed, real-time monitoring, analysing, and responding to incoming messages, comments, and inquiries on multiple platforms were among the key challenges faced by the EDMOs. These challenges could be curbed by the use of social media management tools streamlining online presence for the EDMOs (Hanafizadeh, Shafia & Bohlin, 2021; Daimiel & Estrella, 2021). By adopting these tools, the EDMOs can achieve an automated and more efficient approach to handling their social media presence. This would enable them to effectively interact with the public, monitor relevant metrics, and gauge the impact of their communication strategies. The deficit in the availability of computers, smartphones, and social media personnel can be directly traced back to the insufficient allocation of resources, with its roots primarily grounded in the budgetary constraints as elaborated upon in section 7.2.1. These limitations have potentially led to the EDMOs' inability to procure an adequate number of resources, which are essential tools for the efficient functioning of social media personnel. The budgetary restrictions are highlighted as a prominent factor hindering the EDMOs' ability to invest in the necessary technology and equipment. The consequences of these budgetary constraints might have a cascading effect on the recruitment and retention of social media personnel.

In contrast to tangible resources, intangible resources hold a distinct, yet indispensable, role in the operations of EDMOs as they navigate social media platforms. This finding is significant especially in expanding the RBT theory which focuses on tangible assets (Marchand, Hennig-Thurau & Flemming, 2019). These intangible assets include a wide array of elements that played a critical role in the effectiveness and success of the EDMOs in their digital endeavours. These resources, explained below, are often less visible but were equally vital for achieving the EDMOs' goals in the social media landscape.

- *Social Media Skills*: Proficiency in social media platforms and the ability to use them strategically is paramount. The EDMOs possessed a team of personnel who are not only well-versed in the technical aspects of social media but also possessed the skills to craft compelling messages and engage with the audience effectively. Such skills are necessary for navigating the platforms effectively and responding to emerging situations during crises (Sutton et al., 2015).
- *Collaborative Networks*: Building and maintaining relationships with various stakeholders, both within and outside the organization, is crucial. Collaborative

networks enabled the EDMOs to leverage external expertise, share information, and access resources that may be otherwise unavailable. This is supported by findings of Guerrero et al. (2023) and Sapat, Esnard and Kolpakov (2019) who posit that collaboration during disasters can prompt the public to take preparedness measures and enable the sharing of information and resources across organizations.

- *Expert Knowledge*: In the realm of emergency and disaster management, having access to expert knowledge and guidance is invaluable. This includes the collective knowledge and experience of professionals within the organization, providing insights and guidance for making informed decisions in disaster or emergency situations. As emphasized by Groeve (2020), Medford-Davis and Kapur (2014), and Weichselgartner and Pigeon (2015), the significance of expert knowledge in disaster communication lies in its capacity to uphold the trustworthiness and credibility of the information being disseminated.
- *Protocols and Guidelines*: Well-defined protocols and guidelines served as a framework for action for the EDMOs. These documents are essential in ensuring that social media efforts align with the EDMOs' mission during disasters. While EDMOs A, B, and D lacked written and established protocols and guidelines, instances of their usage were observed in the remaining two case organizations, EDMO C and E. Disaster communication protocols and guidelines are the foundation upon which effective social media communication during disasters is built as they offer direction and guidance to stay on course ultimately serving the purpose of safeguarding public safety in times of disaster (Haupt, 2021).
- *Adaptive Learning and Training Culture*: Given the rapidly evolving nature of social media and the digital landscape, EDMO C and E especially fostered a culture of continuous learning and adaptation. This involved staying up-to-date with the latest trends, tools, and best practices and ensuring that personnel receive ongoing training to enhance their capabilities. This is essential as it equips staff with the requisite skills and knowledge to navigate new challenges and technological advancements as they arise (Arslan et al., 2021).

Both tangible and intangible resources play central roles in empowering the EDMOs in their social media initiatives. These resources collectively enhance the capability of the EDMOs to adeptly navigate the social media landscape while effectively carrying out their mission in

managing emergency and disaster events. The following theoretical proposition substantiates and reinforces our research findings.

Proposition 7:	*An organization's communication success on social media is directly influenced by its ability to harness and effectively deploy its tangible and intangible resources.*

Thus, the research findings underscore the critical role of both tangible and intangible resources in enhancing the EDMOs communication efforts during the Accra floods and the COVID-19 pandemic. While the EDMOs effectively utilized various hardware tools, a deficiency in social media management tools and a shortage of computers, smartphones, and tablets were identified. Addressing these shortcomings, especially through the adoption of social media management tools, is crucial for real-time monitoring and response. The budgetary constraints highlighted as a primary factor behind these resource limitations necessitate attention for improved resource allocation. Additionally, the study recognizes intangible resources such as social media skills, collaborative networks, expert knowledge, protocols, and adaptive learning cultures as indispensable for successful emergency communication. This understanding challenges traditional resource-based theory by emphasizing the importance of both tangible and intangible elements in achieving organizational goals during crises.

8.4.2 Dynamic Capabilities

The application of the DCV theory (Teece, 2007a) has allowed us to delve deep into the dynamic capabilities of the EDMOs, highlighting their proficiency in *sensing*, *seizing*, and *transforming* (three essential processes in DCV) their resources and competencies. This adaptability is instrumental in enabling the EDMOs to effectively manage their social media presence during emergencies and disasters, ultimately ensuring the safety of the public they serve. The research findings provide strong evidence of the EDMOs' ability to wield these dynamic capabilities successfully. They have demonstrated their ability in *sensing* the changing landscape of communication, *seizing* opportunities to act swiftly and effectively, and *transforming* their social media resources and competencies to meet the evolving needs of the situation. This three-fold dynamic capability serves a triad of strengths that the EDMOs possessed, equipping them to manage disaster effectively.

In addition to these three established dynamic capabilities, our research has unveiled another significant aspect – the concept of *ordinary capabilities*. Surprisingly, this facet has not received the recognition and attention it deserves, particularly within the context of the DCV

theory. *Ordinary capabilities*, while less recognised than their dynamic counterparts, are the foundation on which the EDMOs build their resilience and preparedness for disasters. They include the routine functions, processes, and skills that might not be as dynamic but are indispensable for sustaining an organization over time. There is another interesting discovery that our research has brought to light— the emergence of *collaborative capabilities*. In disaster management, collaboration has become a key driver of success. *Collaborative capabilities* represent the EDMOs' ability for forging partnerships, sharing resources, and synchronizing efforts in the face of emergencies and disasters. The ability to work seamlessly with other agencies, governmental bodies, NGOs, and community stakeholders during emergencies and disasters is a dynamic capability that helped the EDMOs in managing disasters better.

The findings of this research are supported by a multitude of prior research studies that underscore the importance of dynamic capabilities. For example, organizations that proactively engage in *sensing* emerging risks, staying abreast of technological advancements, and monitoring social media trends demonstrate a greater ability to safeguard their communities from the impacts of disasters and emergencies (Birkland, 2006; Comfort et al., 2010). Those organizations adept at *seizing* opportunities presented by their external environments are in a better position to infuse innovations into their day-to-day operations (Izumi et al., 2019), while those capable of *transforming* these opportunities exhibit a capability to adapt and evolve in response to risks and challenges (Duchek, 2020). Thus, the significance of dynamic capabilities, including the *ordinary capabilities* and *collaborative capabilities* developed in this study, lies in their capacity to empower the EDMOs to adapt, innovate, and thrive in a changing landscape of social media during disasters. In light of this, we suggest the following theoretical proposition.

Proposition 8:	*In dynamic and uncertain environments, organizations that possess strong dynamic capabilities, are better positioned to capitalize on innovations, thus enhancing their management functions.*

Theoretical proposition eight underscores the impact of dynamic capabilities on organizations, influencing their ability to adapt, innovate, and thrive in today's rapidly changing and competitive landscape. This impact, as observed within the context of the EDMOs and highlighted in Figure 8.3, offers a compelling perspective on the significance of these capabilities in practice.

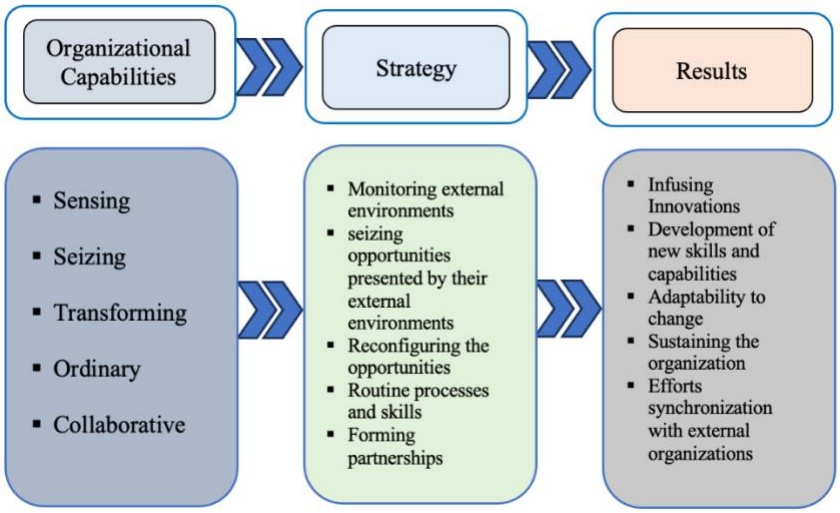

Figure 8.3 Organizational Dynamic Capabilities Impact

8.5 Chapter Summary

This chapter gave a theoretical foundation for addressing the research questions, providing an understanding of the role of social media in disaster and emergency communication. The chapter not only delved into the ways in which the EDMOs utilized social media for information gathering but also explored the processes of information dissemination during emergency and disaster events. Furthermore, it scrutinized the impact of disseminated information on risk management, shedding light on the tangible outcomes of these communication strategies. The chapter is structured to align with the research questions while presenting propositions to encapsulate the findings. Table 8.3 below serves as a roadmap, mapping the research questions to the relevant sections and discussions within the chapter. This mapping provides a reference point for seeking insights into particular aspects of the research.

Table 8.3 Mapping Research Sub-Questions and Answers

No.	Sub-Question	References to Answers
1	In what ways can social media be used for gathering emergency and disaster information?	Section 8.3.1; Table 6.7
2	How is information disseminated by the EDMOs during emergency and disaster events?	Section 8.3.2; Table 6.10;
3	How did the disseminated information impact on emergency and disaster risks management?	Section 8.3.3
4	What are the current capabilities of the EDMOs to use social media?	Sections 8.3.1; 8.3.1.1; 8.3.1.2; 8.3.4; 8.4 – 8.4.2; Table 6.8; Figure 7.1
5	How could their capabilities be increased?	Sections 8.3.1.1; 8.3.1.2; 8.3.8; 8.4 – 8.4.2; Figure 8.1; Figure 8.2

CHAPTER NINE
CONCLUSION

9.1 Introduction

This thesis investigated the use of social media as a tool for emergency and disaster communication. In the preceding chapter, we delved into the research findings and put forth eight theoretical implications regarding the application of social media in the context of emergency and disaster communication. In this chapter, we provide a summative overview of the research, outlining its implications, highlighting its contributions and limitations, offering suggestions for future research endeavours, and sharing the researcher's personal reflections on the research journey. The chapter concludes by evaluating the research and presenting the key takeaways that have emerged from this investigation.

9.2 Overview of the Research

The primary research question for this study was:

"*To what extent is social media currently and potentially used as a tool for emergency and disaster communication?"* The study engaged in an investigation of the EDMOs' activities and processes which involved an analysis of their communication strategies, their use of social media platforms, and their response protocols during the COVID-19 pandemic and the 2021 Accra floods. By studying the actions and decision-making processes of these organizations, the study aimed to gain valuable insights into how they employed social media as a means of communication. The primary question was answered through five sub questions as follows.

- In what ways can social media be used for gathering emergency and disaster information?
- How is information disseminated by the EDMOs during emergency and disaster events?
- How did the posted information impact on emergency and disaster risks management?
- What are the current capabilities of the EDMOs in using social media?
- How could their capacities be increased?

In line with the exploratory nature of the study, we opted for a qualitative research methodology. The rationale for this choice was rooted in the intention to understand the phenomena under investigation thoroughly. In doing so, we embraced an interpretivist paradigm, aligning with a case research strategy that involved a hybrid inductive-deductive lens. To gather the necessary data, we employed a multifaceted approach, with interviews as the main data collection instrument and supported by an examination of social media platforms, document reviews, and an analysis of

media reports. This research was conducted in the EDMOs operating within the geographical context of Ghana using purposive sampling allowing us to interview a diverse range of participants, including heads of communication units, communications assistants, operations assistants, and research and ICT personnel.

As the theoretical underpinning of our study, we drew upon the STREMII model, Resource-Based Theory (RBT), and the Dynamic Capability View (DCV). This combination of theoretical frameworks was substantiated by our assertion that it offered a more cogent framework for discussing the role of social media and its associated resources in the realm of emergency and disaster communication. The combination of the theories proved to be advantageous in several ways. By merging these three theoretical perspectives, we were able to construct a holistic understanding of the dynamics of utilizing social media in emergency and disaster communication. Each theory contributed specific insights that, when combined, provided a more comprehensive view of the subject matter. The STREMII model facilitated an examination of the strategic components of social media usage in emergency and disaster communication. In parallel, RBT theory allowed us to delve into the tangible and intangible assets and capabilities that the EDMOs leveraged through social media. Meanwhile, the DCV theory enabled us to explore how the EDMOs adapted and evolved their social media practices in response to changing circumstances. The triangulation of these theories provided a strong foundation for the analysis of data, enhancing the depth of the study. It allowed us to scrutinize the interplay of strategies, resources, and adaptability in the context of emergency and disaster communication.

9.3 Summary of Findings

The application of the STREMII model, RBT theory, and DCV theory has provided a framework for understanding the dynamics of social media utilization in emergency and disaster communication. These findings offer practical guidance for highlighting the importance of strategic planning, resource allocation, and adaptability in leveraging social media effectively for public safety and disaster management and are summarized in the following points:

- *Social media as a source for gathering emergency and disaster information*— social media served as a key resource for the EDMOs for gathering vital information during emergencies and disasters which was demonstrated during the 2021 Accra floods and the COVID-19 pandemic. The EDMOs were able to collect images, messages, and requests for assistance from social media to identify affected areas and deploy resources promptly. Eye-witness accounts was another strategy used by the EDMOs which offered

on-the-ground perspectives, enhancing their understanding of the situation. The EDMOs also follow experts in relevant fields on social media to access valuable knowledge and risk mitigation strategies. Crowdsourcing is another technique used for information gathering, enabling them to uncover service requests and leverage the collective intelligence of the public, including victims and volunteers actively involved in disaster response. These findings, summarized in Table 6.7, contributed in answering sub question one.

- *Information Dissemination Behaviour of EDMOs*— The research reveals how the EDMOs effectively disseminated information during the two crises which is presented in Table 6.10 and provided answers to sub question two. This understanding contributes significantly to improving disaster management practices. The EDMOs play a crucial role in sharing essential information related to hazards, vulnerabilities, and mitigation strategies during emergencies and disasters. The study highlights the importance of EDMOs' proactive use of social media, particularly Facebook, to provide critical information during crises. They not only shared data but also fostered community resilience through regular updates about the floods and the pandemic. Additionally, social media enabled the EDMOs to provide instructions for accessing aid and resources, benefiting both disaster-affected individuals and aiding the coordination of volunteers and aid organizations. The broad reach of social media also inspires increased solidarity and generosity, extending the impact of EDMOs' efforts beyond the immediate affected population. In essence, the research emphasizes the key role of EDMOs in information sharing, ultimately enhancing disaster management and community support.
- *Impact of emergency and disaster information*— These findings essentially addressed sub question three. Social media served as a crucial communication platform between the EDMOs and communities affected by the Accra floods and the COVID-19 pandemic. While the EDMOs effectively shared vital information, the communities could seek clarification and express concerns, with responses from the EDMOs. This open communication on social media created a supportive environment, providing assistance and guidance during the two crises. One of the EDMOs' key roles during emergencies was to identify and address the needs of affected communities by sharing information about available relief resources and assistance. This approach connected those in distress with the EDMOs and potential volunteers and donors, streamlining the relief process. Social media helped convey not just the availability of aid but also

specific requirements within affected communities, improving the efficiency of disaster response efforts.

- *Capability of the EDMOs*— Addressing sub question four which explored the current capabilities of the EDMOs, the findings show that the case organizations exhibited some capabilities which are presented in Table 6.8 and Figure 7.1. The findings also reveal that while social media proved invaluable for the EDMOs, they faced numerous challenges. Despite these obstacles, their effectiveness in responding to emergencies and disasters was significantly aided by a range of valuable resources, comprising both tangible and intangible assets. These resources played various roles in facilitating communication during disasters. Additionally, the EDMOs not only possessed these valuable resources but also succeeded in dynamically harnessing and optimizing them to respond effectively to the evolving circumstances in emergencies and disasters. This demonstrated the EDMOs' capability to adapt and reconfigure these resources in response to changing conditions, ensuring their long-term success in disaster management.
- *Increasing the capability of EDMOs*— This section addressed sub question five and as part of addressing this sub question, the study introduces new models, as depicted in Figures 8.1 and 8.2, which offer a more dynamic and responsive approach to disaster management using social media. These models recognize the dynamic nature of disasters and the significance of combatting misinformation and utilizing supportive technologies while engaging with affected communities. Implementing these models has the potential to bolster the capacities of EDMOs, empowering them to respond more efficiently to emergencies and disasters ultimately saving lives and reducing the impact of disasters and emergencies.

9.4 Implications for Emergency and Disaster Communication

The findings from this study underscore the significance of social media as a tool for emergency and disaster communication. Social media's real-time nature enables the swift gathering and dissemination of vital information during emergencies and disasters. During emergencies and disasters, the public capture and share photos, videos, and give first-hand accounts of the situation, providing valuable insights to the EDMOs. Information dissemination by the EDMOs on the other hand cultivates a sense of engagement and solidarity within affected populations and stakeholders, leading to more proactive disaster management efforts. This information exchange helps the EDMOs better understand the evolving situation

and make informed decisions. Communication through social media platforms also helps the EDMOs build trust and credibility with the public. By providing accurate and timely information, addressing concerns, and actively engaging with the public, the EDMOs can establish themselves as reliable sources of information. This, in turn, fosters confidence among the public and enhances overall disaster response and recovery efforts.

The EDMO's success on social media hinges on their capability to harness and leverage both tangible and intangible resources. While tangible resources provide the necessary infrastructure, intangible resources are the driving force behind effective communication. Combining both aspects allows the EDMO to make efficient communication and respond to emergencies and disasters competently. Without a balance between these resources, the EDMOs' social media communication may lack depth and effectiveness. In addition, possessing strong dynamic capabilities is instrumental in positioning the EDMOs to capitalize on innovations and technological advancements, thereby enhancing their communication functions. Dynamic capabilities refer to an organization's ability to adapt, innovate, and respond to changes in its environment (Teece, 2007b; Teece, Pisano & Shuen, 1997). In the context of the EDMOs, these capabilities are particularly relevant for optimizing their use of technology and communication strategies.

9.5 Research Contributions

The research offers valuable contributions to enhancing communication strategies, particularly for emergency and disaster management organizations, as well as to the broader literature in this field. These contributions are categorized into two subsections: *theoretical* and *practical.*

9.5.1 Theoretical Contributions

The first theoretical contribution of this study lies in the introduction of three models, each designed to enhance our understanding of the utilization of social media for disaster management. Firstly, the S3M model, represented in Figure 8.1, serves as a valuable tool offering insights into strategies for addressing misinformation on social media during emergencies and disasters. Secondly, the EDC model, depicted in Figure 8.2, contributes to our understanding by providing a structured framework for emergency and disaster communication. Lastly, the mapping of dynamic capabilities, presented in Figure 7.1, enriches our theoretical understanding by illustrating how disaster management organizations adapt and evolve their capabilities in response to the dynamic nature of disasters and social media.

The second theoretical contribution of the research is the operationalization of the STREMII model to elucidate the communication behaviour of disaster management organizations on social media. This contribution is significant as it enhances our theoretical understanding of how these organizations engage with social media platforms during emergencies and disasters, thus, contributing to the advancement of communication theories specific to emergency and disaster situations.

The third theoretical contribution of the research arises from the eight propositions derived from the study, shedding light on the multifaceted role of social media in disaster and emergency communication. These propositions provide valuable theoretical insights into the dynamics of social media use in the context of emergencies and disasters and are presented below:

1. In times of emergencies and disasters, social media emerges as a dynamic and responsive information resource.
2. Information dissemination by disaster management organizations cultivates a sense of engagement and solidarity within affected populations and stakeholders, leading to more effective disaster management efforts.
3. Information disseminated by disaster management organizations on social media plays a key role in shaping public opinion and increasing awareness during emergencies.
4. During disasters and emergencies, the successful implementation of supporting technologies ensures uninterrupted communication, reducing the vulnerability of social media platforms.
5. The use of social media for internal communication during emergencies and disasters improves coordination and information sharing within disaster management organizations, ultimately leading to more effective response efforts.
6. Dialogic communication, characterized by active engagement with the public on social media, enhances an organization's ability to respond to crises.
7. An organization's communication success on social media is directly influenced by its ability to harness and effectively deploy its tangible and intangible resources.
8. In dynamic and uncertain environments, organizations that possess strong dynamic capabilities, are better positioned to capitalize on innovations, thus enhancing their management functions.

These theoretical propositions have the potential to enhance theories related to crisis and disaster communication and they offer a foundation for formulating hypotheses and conducting further research to test and refine them.

The fourth theoretical contribution emanates from expansion of the theoretical frameworks employed in the research which are the STREMII model, RBT theory, and DCV theory. The primary concern revolving around the STREMII model is its inherent linearity, offering a rigid sequence of steps that should be followed in a linear fashion (Bukar et al, 2020; Stewart & Young, 2018). This study suggests that the reality of managing disasters and emergencies is far from being as structured and sequential as the STREMII model implies. These events often unfold with unpredictable situations, necessitating an adaptive approach for managing them. The model does not also address the issue of misinformation and supporting technologies amidst social media disruptions. All these gaps are indispensable for effective crisis communication; hence, we proposed a new model as shown in Figure 8.2 to enhance the STREMII model. Additionally, the research highlighted new information gathering and disseminations strategies as summarized in Tables 6.7 and 6.10 respectively. This expands and enhances the STREMII model for using it to study emergency and disaster communication on social media.

Furthermore, the study unveiled new insights that can potentially address the gaps within the DCV and RBT theories. Notably, the study provides a compelling argument on the importance of intangible resources which have not been given attention in the RBT theory (Marchand, Hennig-Thurau & Flemming, 2019). The intangible resources relevant to social media communication revealed in this study are *social media skills*, *collaborative networks, expert knowledge, protocols and guidelines,* and *adaptive leaning and training culture.* In addition, the study revealed the emergence of a new theme— the *continuous learning* capability demonstrated by the EDMOs. This aspect has been relatively neglected in both the DCV and RBT theories. The study effectively bridges this theoretical gap by explaining the connection between transformative capability and an organization's ability to learn and adapt. Traditionally, transforming capability, a central concept in DCV and RBT theories, primarily pertained to an organization's ability to reconfigure its resource base in response to opportunities or competitive threats (Teece, Pisano & Shuen, 1997; Teece 2007b). However, these theories overlooked an organization's potential to extract valuable insights from past

experiences. The transformative potential of learning from past experiences remained insufficiently explored within the theories, creating a significant knowledge gap.

Another significant theme from the study is the concept of *ordinary capabilities*, encompassing internal routine activities and processes that form the bedrock of EDMOs' operations and are indispensable for effective disaster response. In the broader context of disaster management and organizational theory, the concept of *ordinary capabilities* has not received the attention it deserves, especially in the DCV and RBT theories. These theories predominantly emphasize dynamic and strategic capabilities, focusing on an organization's ability to adapt, innovate, and gain a competitive edge in dynamic environments. While dynamic capabilities are undoubtedly important, they should not overshadow the importance of *ordinary capabilities.*

Furthermore, the study shed light on the *collaborative capabilities* exhibited by the EDMOs as yet another new theme. These collaborative capabilities involve the establishment and management of relationships with external stakeholders, representing a significant and dynamic aspect of their disaster management strategies. This underscores the vital role of collaboration in ensuring the safety and well-being of communities during emergencies and disasters. The emergence of this new theme presents an opportunity to enrich and extend the DCV and RBT theories. The DCV framework highlights the inherent dynamism within organizations, emphasizing their adaptability and evolution over time. This newfound theme within the EDMOs underscores their agility and adaptability in actively engaging external stakeholders. By establishing and nurturing relationships with diverse entities, it helped the EDMOs to respond effectively to disasters. This insight enhances the DCV framework by emphasizing the importance of strategic alliances and relationship-building as essential facets of an organization's dynamic capabilities. Moreover, the RBT framework centres on an organization's resources and capabilities as drivers of competitive advantage. The theme of *collaborative capabilities* showcased by the EDMOs highlights how their ability to engage with a wide network of stakeholders can be considered a valuable resource. These interactions serve as conduits for information, expertise, and support during disasters. Consequently, this new theme underscores the relevance of stakeholder relationships as dynamic capability and as a distinct resource within the RBT and DCV framework, deepening our understanding of how organizations can leverage such resource to enhance their resilience and effectiveness.

9.5.2 Practical Contributions

The three models (depicted in Figures 7.1, 8.1 and 8.2) represent a perspective on the key role of social media in the domain of emergency and disaster management. These models are not merely theoretical constructs but serve as practical and insightful conceptual frameworks, poised to guide and inform real-world applications. They offer an understanding of the dynamics inherent in leveraging social media for the facilitation of effective disaster communication and management. Thus, the significance of these models extends beyond academic discourse, as they possess the potential to be instrumental in guiding practical applications in the field of emergency and disaster management. By providing structured frameworks, they offer a roadmap for practitioners and decision-makers to navigate the complexities associated with incorporating social media into their strategies. These models serve as valuable tools for those engaged in disaster response and management, offering a systematic approach to harness the benefits and navigate the challenges posed by the landscape of social media. The transformative potential of the models is in their capacity to inform strategies and guide decision-making processes. By encapsulating key elements of social media dynamics during disasters, they empower organizations to make informed choices in their communication and management approaches. Furthermore, these models contribute to the ongoing evolution and enhancement of disaster management practices in the contemporary era of social media. They provide a foundation upon which organizations can build and refine their methodologies, adapting to the evolving nature of technology and communication platforms.

The study also reveals the diverse strategies adopted by each EDMO emphasizing the importance of learning from examples and best practices observed in each case. The identification of distinct strategies in the study serves as a valuable repository of knowledge that can be leveraged by disaster management organizations for continuous improvement and refinement of their disaster management approaches. By examining this diversity, organizations can identify strategies that align with their specific needs, resources, and the nature of potential disasters they may face. Learning from both successes and challenges enables organizations to adopt a proactive approach, implementing strategies that have proven effective while anticipating and mitigating potential drawbacks. The study provides a benchmarking opportunity for other disaster management organizations, encouraging them to compare their existing strategies with those outlined in the study, identify areas for improvement, and foster innovation in disaster management.

The theoretical propositions also have practical implications. One of the practical implications lies in their ability to inform the development of communication strategies. Disaster management organizations, in particular, can benefit immensely from this knowledge. They can craft communication strategies that are well-informed and tailored to the social media communication. This, in turn, ensures that their messages and actions resonate with the communities they serve during emergencies and disasters. Furthermore, understanding the role of social media, as outlined in these propositions, allows organizations to align with best practices. It provides a basis for evaluating the effectiveness of their communication strategies which ensures that they remain agile and responsive, adapting to changing social media landscape and user behaviours.

9.6 Limitations of the Study

The research adopted a qualitative research methodology, which enabled us to delve deeply into the subject matter, employing both inductive and deductive approaches. This method facilitated a thorough investigation of the phenomena under scrutiny. However, it is essential to acknowledge that the scope of the research might have been influenced and limited in certain ways. The qualitative approach we employed primarily relied on the input and insights of officers working within the EDMOs. While this allowed us to gain a rich understanding of their perspectives, experiences, and opinions, it did introduce certain limitations. These officers brought their unique viewpoints and experiences, which could introduce subjectivity into the findings. Moreover, their roles within the case organizations might lead to organizational biases that might not fully represent the broader landscape of disaster management practices. Another significant aspect that should be highlighted is the importance of including the viewpoints of the public, particularly the affected communities, in research of this nature. Their experiences and perspectives could help in comprehending the effectiveness of disaster management practices and communication strategies holistically. Unfortunately, due to the scope of the research, we were unable to incorporate their viewpoints into the study. This limitation underscores the need for future research to take a more comprehensive approach by including the voices of the public and affected communities.

While the qualitative research approach employed in this study offered a wealth of insights and understanding of the subject matter, it is important to acknowledge that it might have limitations when it comes to generalizability of the findings. Qualitative research tends to focus on a relatively small sample of participants, which can make it challenging to generalize the

findings to larger populations. In contrast, quantitative research methods offer a more statistically significant perspective that can be generalized to a broader context. The qualitative methodology allowed us to capture the depth of individual experiences, opinions, and perspectives enabling us to explore specific cases and contexts in detail. However, because of the limited sample size and the qualitative nature of the data, the findings might be context-specific and may not apply universally to larger populations.

Despite the limitations of this study, it represents a substantial contribution to both theoretical understanding and practical applications in the field of emergency and disaster communication on social media. The recognition of these limitations should not diminish the significance of the research; instead, it encourages a more critical and analytical interpretation of the findings, which, in turn, makes this study a valuable tool for both researchers and disaster managers. By shedding light on the multifaceted aspects of emergency and disaster communication through social media, this research enriches theoretical understanding of this domain. It provides a foundation upon which future studies can build and refine their investigations. The limitations acknowledged in the study invite a closer examination of the findings, helping to identify areas that warrant further exploration and refinement in future research. In this way, the research becomes a stepping stone for the ongoing development of theories and frameworks in the field. Furthermore, the practical implications of this research are noteworthy especially for emergency and disaster managers who can draw upon the insights derived from this study to enhance their communication strategies.

9.7 Future Research Suggestions

The limitations identified in the preceding section serve as valuable insights and foundations for potential future research endeavours. This study suggests three directions for future work, with the aim of addressing these limitations. Additionally, it emphasizes the importance of validating the proposed theoretical propositions, studying how social media platforms and organizational resources, as well as dynamic capabilities, can enhance organizational communication on social media.

Incorporating views of public and affected communities

Building upon the findings of the study, future research should strive to incorporate the viewpoints and experiences of the public and the affected communities. This approach is essential to maintain a balanced and holistic perspective on disaster communication on social media. The inclusion of these perspectives can provide a well-rounded understanding of the

effectiveness of communication strategies during emergencies and disasters. By conducting surveys, interviews, and focus groups with members of the public and affected communities, researchers can gain insights into their experiences, preferences, and expectations regarding disaster communication on social media. This inclusive approach can help identify gaps, challenges, and opportunities for more effective communication practices. Moreover, there were significant floods in Ghana in 2015, 2016, 2020, 2022, and 2023, in addition to the floods in 2021. For future research, a longitudinal analysis of these flood events could provide valuable insights into their relative severity—such as the size of the affected area, number of deaths, and injuries—as well as the different technological measures implemented in response to each incident. This analysis could help identify patterns, evaluate the effectiveness of interventions, and explore what measures could be taken to prevent the recurring damage and loss of life. Furthermore, future work could include capturing the posts and visuals shared by EDMO officials during the floods and the COVID-19 pandemic. These materials could serve as examples of best practices or be subjected to content analysis. Integrating these approaches would not only highlight effective communication practices but also offer critical insights into how social media has been utilized to engage with affected communities, enhance public awareness, and mobilize resources during emergencies.

Again, there seems to be an underlying assumption by the EDMOs that the "preventive measures" they outlined during the COVID-19 pandemic were universally reasonable and effective, which may not reflect the full scope of the debate surrounding these measures. Further research needs to be carried on:

- **Effectiveness of Masks**: Did masks work as intended, or did they potentially contribute to the recirculation of the virus, impede the expulsion of pathogens, and result in massive environmental pollution, particularly from disposable masks?
- **Efficacy of Hand Sanitizers**: Were hand sanitizers effective, given that COVID-19 was primarily airborne and not spread through surface contact? Moreover, the widespread distribution of dangerous sanitizers—with over 600 brands recalled in the United States due to toxic ingredients—raises further concerns.
- **Impact of Social Distancing**: Did social distancing achieve its intended purpose, or could the rapid spread of COVID-19 among demographics with low susceptibility to severe illness (such as children and young adults) have accelerated the development of herd immunity?

- **Validity of Vaccine Mandates**: Were vaccine mandates the most effective and equitable approach, or would it have been more beneficial to prioritize informed consent and allocate limited vaccine resources to vulnerable populations, such as the elderly in resource-poor countries, instead of to children and young adults in the West?
- **Effectiveness of COVID-19 Testing**: Did widespread COVID-19 testing reduce the spread of the virus, or did it inadvertently increase exposure by causing people to gather at testing sites, potentially mixing infected individuals with those who were not?

Mixed-methods approach

To further enhance the comprehensiveness and generalizability of research in the field of emergency and disaster communication on social media, future studies can benefit from employing a mixed-methods approach. This methodological blend combines the strengths of qualitative research, which offers rich insights and in-depth understanding, with quantitative research, which provides statistical significance and broad applicability. By integrating both qualitative and quantitative data collection and analysis techniques, researchers can gain a more comprehensive view of the subject matter. This mixed-methods approach allows for a more detailed exploration of disaster communication practices, offering more insights while still enabling generalization to larger populations. Moreover, it can facilitate the identification of patterns and trends that may not be as evident through qualitative research alone.

Validation of theoretical propositions

It is essential for future research to validate the proposed models and theoretical propositions introduced in this study. These propositions suggest that social media platforms, organizational resources, and dynamic capabilities play a significant role in enhancing organizational communication during disasters. Validation can be achieved through empirical research that tests the practical applicability and impact of these propositions. Researchers can assess the effectiveness of social media communication strategies employed by disaster management organizations in different disaster scenarios. By conducting case studies and surveys, future research can confirm the validity of these theoretical propositions and provide concrete evidence of their relevance and utility in the field of disaster communication.

These suggested directions for future research not only address the limitations of the study but also hold the potential to advance understanding of emergency and disaster communication on social media. By embracing a more inclusive approach involving the public, adopting a mixed-methods research design, and validating the theoretical propositions, future research can

contribute to a more detailed disaster management practices and help in enhancing the resilience of communities in times of crisis.

9.8 Researcher's Reflections

The following sections delve into our reflections regarding the research journey, which proved to be a process filled with both challenges and opportunities. This transformative journey significantly enriched and refined our philosophy of science. The first section of our reflection centres on the research methods and how our perceptions changed throughout the research process which is vital in interpretive research (Klein & Myers, 1999). The second section focuses on the impact of the research on our perspectives. The third part of our reflection delves into the various challenges encountered during the research journey. We discuss how these challenges provided valuable lessons that enhanced our research skills. In the final section, we evaluate the research process as a whole.

9.8.1 Reflections on the Research Methods

Interpretive research is grounded in the assumption that our understanding of reality is shaped by social constructions, such as artifacts, documents, and shared meaning (Klein & Myers, 1999). Essentially, the use of social media platforms involves the creation and dissemination of various artifacts and the mobilization of resources. Therefore, we believed that the STREMII model, with its six-phase constructs, was a fitting framework for comprehending how social media is used in the context of emergency and disaster communication. Nonetheless, the STREMII model did not fully explain the dynamics of social media resources and the organizational capabilities required to effectively harness them for emergency and disaster communication. This inadequacy prompted us to integrate the RBT and DCV theories. By merging these three theories, we were able to construct a more comprehensive framework that provided a deeper understanding of the role of social media and its associated resources in the context of emergency and disaster communication. This provided a more holistic perspective, enabling us to explore the process of using social media and the strategic allocation of resources and dynamic capabilities within the EDMOs. We acknowledge that the findings of the study might have been different had other theoretical frameworks been used. However, the selection of our chosen theories and research approaches was deliberate and well-suited to the research objectives. These choices facilitated a more effective linkage between social media usage, available resources, and the dynamic capabilities of the EDMOs.

We acknowledge that the process of selecting cases for this study was not entirely purposive. The selection of the EDMOs and their participants in the research was primarily driven by practical considerations, such as availability, convenience, and cost-saving measures. Additionally, we emphasized the importance of obtaining full consent from all participants before their inclusion in the study. While the case selection process may not have been strictly purposive, it was guided by several key factors. Firstly, we ensured that the selected cases exhibited the phenomenon of interest, which was crucial for addressing our research questions effectively. This allowed us to focus on real-world scenarios where social media use, resources, and dynamic capabilities were relevant to emergency and disaster management. Secondly, we took into account the specific characteristics of the chosen organizations and participants. This consideration was vital in ensuring that the information collected was relevant to the research objectives. The diversity and uniqueness of these cases added depth to the study, enhancing the reliability of the findings.

The process of determining the unit of analysis for the study required careful consideration. Notably, we encountered a dilemma concerning the concepts of emergency, disaster, and crisis, which we ultimately used interchangeably in the research. The interchangeable use of the terms reflects the multifaceted nature of the investigated phenomena. While these terms may carry distinct definitions in specific contexts, they often overlap in the field of emergency and disaster management. This flexibility allowed us to explore a broader spectrum of situations that encompassed all these concepts, ensuring a comprehensive understanding of the research area. Additionally, we grappled with the choice between focusing on disaster communication and disaster management as the primary unit of analysis. In the end, we decided to prioritize communication as the primary unit and management as the secondary unit of analysis. This was driven by the central role that communication plays in emergency and disaster management. Effective communication is essential for coordinating responses and ensuring critical information is available. By focusing on communication as the primary unit of analysis, we were able to delve deeply into the dynamics of information flow, social media utilization, and the impact of communication on overall emergency and disaster management processes. Management, although secondary in our analysis, was still integral to understanding how these processes were organized and executed within the EDMOs.

9.8.2 Impact on Personal Perspective

Research process often has an impact on researchers' personal perspectives leading to changes in viewpoint and a deeper understanding of the subject matter (Staley, Abbey-Vital & Nolan, 2017).

This research increased our awareness of the essential role that social media plays in the realm of emergency and disaster management and its unparalleled ability for gathering and disseminating critical information rapidly. This understanding underscored the transformative power of technology in enhancing disaster response and recovery efforts. Also, the research process illuminated the multifaceted nature of emergency and disaster management. It became evident that effective response and recovery efforts require a delicate balance between communication, available resources, and organizational capabilities. This realization shed light on the challenges that the EDMOs face in harnessing the potential of social media. The complexities of this interplay became more apparent through the research. Again, the research shed light on the dynamic nature of emergency and disaster management practices. We discovered that these practices are continually evolving to adapt to the changing technological landscape. This perspective deepened our understanding of the need for ongoing adaptation, innovation, and preparedness within the field. In summary, the research process not only contributed to the academic understanding of the subject matter but also led to a transformation in our personal perspectives. We gained an increased awareness of the role of social media in disaster management, recognized the complexities of the field, and appreciated the evolving nature of emergency and disaster management practices. These insights have not only enriched our scholarly pursuits but also broadened our recognition of the challenges and opportunities facing disaster management organizations in the modern age.

9.8.3 Challenges and Lessons Learned

The research process was challenging, especially when it came to data collection. We encountered various hurdles throughout this phase of the project. One of the challenges was the back-and-forth communication required to obtain data from the participants. This involved multiple rounds of negotiations and clarifications, which added significant time and effort to the process. A particular situation arose when dealing with one of the EDMOs whose responsibilities fell within the realm of security. Due to the sensitive nature of their work, they were opposed to any form of audio or video recording. To ensure compliance with their requirements, they even conducted searches to confirm that we were not secretly recording them. This forced us to rely on traditional and time-consuming methods, where we manually

transcribed their responses by scribbling notes in a notebook. While audio recording would have simplified the process due to its compatibility with automatic transcription, the circumstances did not permit it. Moreover, bureaucracy emerged as another roadblock during the research journey. In some cases, administrative hurdles threatened to significantly delay our progress. To counteract these delays, we had to employ various strategies, including offering incentives and rewards to boost the morale of the participants. These incentives not only helped maintain their engagement but also ensured that the research stayed on track despite administrative challenges. Additionally, the research budget proved to be a constant source of concern. The necessity to travel to the research field from South Africa to Ghana on three separate occasions had a considerable impact on our financial resources. Each trip incurred expenses related to transportation and other logistical needs. These unforeseen expenditures stretched the research budget and required us to carefully manage our finances to ensure the successful completion of the research.

Despite these obstacles, our dedication and commitment to the research project persevered. We learned to adapt to the circumstances and found solutions to address the challenges that arose especially during data collection. One of the key lessons learned was the importance of adaptability and resilience. We realized that rigid adherence to a predetermined research plan can be counterproductive when faced with unexpected challenges. Being willing to adapt the strategies allowed us to overcome obstacles more effectively. The financial pressures caused by multiple research field visits taught us the importance of comprehensive budget planning. Anticipating unforeseen expenses and allocating resources accordingly can help mitigate budget-related challenges. The use of rewards and incentives to boost participant morale and engagement was a valuable tactic. We learned that such strategies can play a big role in maintaining active involvement, even in circumstances where motivation might wane. Overall, the research project reinforced the notion that persistence and determination are vital to overcoming obstacles. It highlighted that a passionate commitment to the research goal can carry a project through difficult times.

9.8.4 Evaluation of the Research

Whetten (1989) proposed seven questions to evaluate the value and significance of a study's contribution. These questions can help researchers and readers critically evaluate the research and its potential impact. These questions are:

- *What is new?* This question prompts researchers to articulate the novelty or uniqueness of their study. It encourages them to identify the aspects of their research that distinguish it from existing work in the field. Highlighting the novel elements of a study can help in establishing its originality and contribution to knowledge.
- *So what?* After identifying what's new, researchers need to explain why it matters. This question urges them to clarify the practical or theoretical significance of their findings. In essence, it challenges researchers to articulate the *so what* factor— why the research is relevant and important to the field or society.
- *Why so?* This question delves into the rationale behind the research design and methodology. It asks researchers to justify their chosen approach and methodology. Explaining *why so* helps in understanding the thought process behind the research, ensuring that the methods align with the research goals.
- *Well done?* Researchers are encouraged to evaluate the quality of their work. This question prompts self-assessment of the research process, methodology, and execution. It ensures that the research is conducted rigorously and upholds the standards of scholarly investigation.
- *Done well?* While *well done* focuses on the quality of the research process, *done well* concerns the effectiveness of the communication. Researchers must assess whether they have effectively conveyed their findings, methods, and implications to their target audience. A well-done study not only produces valuable results but also communicates them clearly.
- *Why now?* This question addresses the timeliness of the research. It prompts researchers to explain why their study is relevant at this particular point in time.
- *Who cares?* Researchers should identify the potential stakeholders, beneficiaries, or individuals who would find their research relevant or useful. Understanding *who cares* helps in defining the audience for the research and tailoring the communication of findings to address their needs and concerns.

A summary of answers to these questions is offered in Table 9.1 even though they have been extensively discussed in the preceding chapters.

Table 9.1 Evaluating the Study Contributions (Whetten, 1989)

Evaluation Question	Answer
What is new?	The study makes a valuable contribution by offering key insights into the use of social media for disaster and emergency communications, focusing on

	relevant research questions addressed through theoretical propositions. In section 9.5, it outlines its substantial contributions to theory, practice, and knowledge. These contributions involve introducing a new model— the *EDC model*, advancing existing theoretical frameworks, practical contributions for real-world disaster management, and an enhanced understanding of the role of social media in disaster and emergency response. As a result, the study's impact extends to both academic research and practical application, providing valuable insights and guidance for improving disaster and emergency communication strategies in the digital age.
So what?	The theoretical propositions put forward in the study carry significant implications for emergency and disaster communication, as highlighted in section 9.4. These implications include insights into how these theoretical constructs can inform and enhance communication strategies during emergencies and disasters, shedding light on the effective use of social media platforms.
Why so?	The study effectively addresses critical gaps in existing social media communication frameworks and theories and the underrepresentation of research focused on the use of social media for disaster management within the African context, as previously highlighted in chapters 1, 2 and 3. To bridge these gaps, the study took an approach by merging three distinct theories - the STREMII model, RBT theory and DCV theory. This integration resulted in a comprehensive framework that offered a deeper and more detailed understanding of the role of social media and the associated resources and dynamic capabilities in the context of emergency and disaster communication. The research design adopted qualitative study methods, including a case study approach, which is well-suited to the research objectives, allowing for the generation of rich data on this phenomenon. Chapter 4 outlines and justifies the chosen research methods, ensuring the methodological soundness of the study.
Well done?	There are reasons to assert that this thesis is thorough. Firstly, the study commenced with a comprehensive review of the existing literature, facilitating the identification of research gaps and paving the way for a structured and thorough investigation. Secondly, the selection of the theoretical frameworks was not arbitrary but meticulously motivated, aligning them with the research's objectives and customizing their concepts to suit the specific context of the study. Furthermore, the thesis offers a clear account of how these frameworks were applied in the research, ensuring their relevance and effectiveness. Thirdly, the research methodology and approach were systematically outlined and thoroughly expounded upon, providing a blueprint that enables other researchers to replicate and verify the study's findings. These three pillars—literature review, theoretical frameworks, and research methodology—demonstrate the completeness and rigor of the thesis.
Done well?	We have confidence in the quality of this dissertation as it exhibits clear writing and contributions. The content is thoughtfully structured in a logical sequence, enabling systematic readership and a smooth flow of ideas. The arguments are presented in a coherent manner, ensuring that the readers can follow and comprehend the content. The balance struck between providing

	sufficient material for a comprehensive understanding is indicative of the careful approach to crafting this dissertation.
Why now?	The study holds contemporary significance for disaster and emergency management organizations especially in developing countries. Many such organizations have grappled with the challenges of implementing various ICT projects in their workplaces, often facing difficulties and setbacks. While the use of social media may appear straightforward, its dynamics during disasters and emergencies demand careful and strategic implementation. This research serves as a valuable resource for these organizations by offering insights into the effective and efficient implementation of social media in disaster and emergency management contexts. It acknowledges the complexities involved in harnessing social media for crisis communication and response, thus providing practical guidance and knowledge that can empower organizations to navigate these challenges successfully.
Who cares?	The study is relevant to a broad audience, including ICT policy-makers, researchers and PhD students employing the STREMII model, RBT theory, and DCV theory, managers and ICT experts, as well as individuals interested in utilizing social media for effective emergency and disaster communication with the common goal of enhancing community resilience during emergency and disaster situations, particularly in developing countries and similar contexts.

9.8.5 Key Research Message

The central research message of this study underscores the role of social media platforms as potent tools for transforming and enhancing the capabilities of organizations on managing emergencies and disasters. These platforms have proven instrumental in gathering and disseminating information, fostering community engagement, and facilitating coordination and response during disasters and emergencies. While the concept of adopting social media for disaster management may initially appear straightforward, the study emphasizes the dynamics that come into play when these platforms are utilized in the context of disasters. Successful implementation in emergency and disaster situations demands a thoughtful and strategic approach. Understanding the intricacies of how social media can be effectively employed within emergency and disaster management is, therefore, not only relevant but also crucial to improving disaster response and overall community resilience.

This research was born out of the recognition of an existing gap in the field, particularly regarding the extent to which social media can be harnessed for effective disaster and emergency communication. It has undertaken an exploration of this gap across its chapters, crafting a methodologically and theoretically robust explanation of the role of social media and the associated resources and dynamic capabilities in the context of emergency and disaster communication. The key message of this study can be succinctly encapsulated in the

understanding that when social media is thoughtfully adopted and used within the context of emergency and disaster management, it holds immense potential for enhancing communication strategies. The study offers a wealth of insights, shedding light on how to make effective use of social media platforms, harness the power of user-generated content, and improve coordination efforts during disasters and emergencies. In doing so, it contributes not only to academic knowledge but also to practical applications in the field, ultimately aiming to bolster community resilience and response capabilities in times of emergencies and disasters.

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APPENDICES

Appendix A: UCT Ethics Approval

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Private Bag X3, Rondebosch, 7701
2.26 Leslie Commerce Building, Upper Campus
Tel: +27 (0) 21 650 4375/ 5748 Fax: +27 (0) 21 650 4369
E-mail: jacques.rousseau@uct.ac.za
Internet: www.uct.ac.za
@Commerce UCT **UCT Commerce Faculty Office**

10 06 2022

Safianu Omar

Department of Information Systems

University of Cape Town

REF: REC 2022/06/011

Social media as a communication tool during emergencies and disasters in Ghana

We are pleased to inform you that your ethics application has been approved. Unless otherwise specified this ethical clearance is valid until 31-Dec-2023 .

Your clearance may be renewed upon application.

Please be aware that you need to notify the Ethics Committee immediately should any aspect of your study regarding the engagement with participants as approved in this application, change. This may include aspects such as changes to the research design, questionnaires, or choice of participants.

The ongoing ethical conduct throughout the duration of the study remains the responsibility of the principal investigator.

We wish you well for your research.

Signed by candidate 2022.06.10 11:31:26 +02'00'

Jacques Rousseau
Commerce Research Ethics Chair
University of Cape Town
Commerce Faculty Office
Room 2.26 | Leslie Commerce Building

Office Telephone: +27 (0)21 650 2695 / 4375
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Website: http://www.commerce.uct.ac.za/com/Ethics-in-Research

Appendix B: A letter to management seeking permission to conduct study and consent form

Department of Information Systems
Leslie Commerce Building
Engineering Mall, Upper Campus
OR
Private Bag X3 - Rondebosch - 7701
Tel: +27 (0) 21 650 2261 Fax: +27 (0) 21650 2280
Internet: http://www.commerce.uct.ac.za/informationsystems/

07 June 2022

Request to conduct research and interview participation consent form

Dear Sir/Madam,

In terms of the requirements for completing a PhD Degree in Information Systems at the University of Cape Town a research study is required.

The researcher, in this case Safianu Omar, has chosen to conduct a case study entitled *social media as a communication tool during emergencies and disasters in Ghana*. The researcher would like to request permission to conduct this case study at your organization. The objective of the research is to find out the extent to which social media is used (or can be used) for emergency and disaster communication while highlighting the challenges and benefit in its use to increase the capacities of emergency and disaster management organizations in Ghana. The research will culminate in developing a new communication framework for better preparedness and response to emergency and disaster events.

We would like to inform you that the ethical aspect of the research ensures the preservation of the identity of the participants, the data collected will be used purely for academic purposes. All personal details will be treated with the highest form of confidentiality. Please note that participation in this research is voluntary and participants can opt out of the study at any time.

The data collection method will be one-one-one interviews with a small group of the staff responsible for your social media and ICT platforms. The interviews will be conducted at a time and place agreed upon by the researcher and your staff and will last between 30 to 60 minutes. If you authorise this study to be undertaken at your organization, please kindly sign the attached form and return to me at your earliest convenience.

Should you have any questions regarding this research, please feel free to contact me on 0268138326 or omrsaf003@myuct.ac.za.

Your organization's participation in this study would be greatly appreciated .

Sincerely,

Safianu Omar.. Signed by candidate
PhD Student, (UCT)
Department of Information Systems
University of Cape Town
Email: omrsaf003@myuct.ac.za

Jean-Paul van Belle…..... Signed by candidate
Research Supervisor
Department of Information Systems
University of Cape Town
Email: jean-paul.vanbelle@uct.ac.za

Management Consent

I, George Ayisi, give the researcher of this study consent to conduct their study in the following organization:

National Disaster Management Organisation

I am aware that participation is voluntary and that respondents may choose to withdraw from this study at any time, should they choose to do so.

Signed by candidate

Signature

08/12/2022

Date

Appendix C: Participant consent form

Department of Information Systems
Leslie Commerce Building
Engineering Mall, Upper Campus
OR
Private Bag X3 - Rondebosch - 7701
Tel: +27 (0) 21 650 2261 Fax: +27 (0) 21650 2280
Internet: http://www.commerce.uct.ac.za/informationsystems/

07 June 2022

Request to conduct research and interview participation consent form

Dear Sir/Madam,

My name is Safianu Omar, a student at the university of Cape Town in South Africa and I am conducting research towards a PhD degree. The research is titled *social media as a communication tool during emergencies and disasters in Ghana* and would like to invite you to participate in the research. I am interested in finding out the extent to which social media is used (or can be used) for emergency and disaster communication while highlighting the challenges and benefit in its use to increase the capacities of emergency and disaster management organizations. The research will culminate in developing a new communication framework for better preparedness and response to emergency and disaster events. This research has been approved by the Commerce Ethics in Research Committee at the university of Cape Town.

Please understand that you do not have to participate. The choice to participate is yours alone. If you choose not to participate, there will be no negative consequence. If you choose to participate, but later decide you want to withdraw, you are free to do so at any time, without negative consequence. However, I would be grateful if you would assist me by allowing me to interview you. The interview may last between 30 to 60 minutes and will be conducted on the date, time and venue agreed by you and may be digitally recorded if you consent to it. The collected data will be anonymized to protect your privacy and will not be used as examples for illustration in this research. The collected data will be used for analysis towards achieving the objectives of the research.

If you are willing to participate in this study, kindly sign the attached form and return to me at your earliest convenience. Should you have any questions regarding this research, please feel free to contact me on 0268138326 or email omrsaf003@myuct.ac.za. Your participation in this study would be greatly appreciated, but is entirely voluntary.

Sincerely,

Safianu Omar……..
PhD Student, (UCT)
Department of Information Systems
University of Cape Town
Email: omrsaf003@myuct.ac.za

Professor Jean-Paul van Belle……
Research Supervisor
Department of Information Systems
University of Cape Town
Email: jean-paul.vanbelle@uct.ac.za

Research Participant Consent Form

I, _____, consent to participate in the research on social media as a communication tool during emergencies and disasters in Ghana.

I am aware that participation is voluntary and that I may choose to withdraw from this study at any time, should I choose to do so.

_____ _____

Signature Date

Appendix D: Interview guide for participants: first round of data collection

Interview Guide: Emergency and Disaster Communication on Social Media

The following questions will serve as a guide for the conversation with respondents, allowing for potential rephrasing or probing in different ways.

A. Respondent's Details

RID:
Organization:
Contact Number:
Current Post:
Department/Area of Expertise:
Outline of major duties:

B. Social Listening

1. Can you describe the specific strategies employed by your organization to gather information on social media platforms during the Accra floods? COVID-19?
2. How did you ensure the accuracy and reliability of the information collected from social media sources?
3. How did your organization identify and prioritize sources of information on social media to ensure timely and accurate data collection?
4. What specific tools or technologies utilized for data gathering, and how have they enhanced your information-gathering capabilities during the two emergencies?
5. What tools or techniques did you use for cleaning and verifying information obtained from social media?
6. Handling substantial volumes of data on social media can be challenging. Can you elaborate on the strategies your organization used to effectively manage and process this data during emergency response efforts?
7. How did you ensure that the analysed information is relevant, reliable, and actionable in the context of emergency management?
8. In dealing with information during crises, particularly in areas facing challenges like power outages and damaged infrastructure, how does your organization ensure a balanced representation in the information landscape?
9. Can you provide examples of instances where your organization successfully addressed misleading information, such as fake news, rumours, or hoaxes, and how did it impact the overall crisis response?

C. Communication Target

10. How did your organization tailor its communication strategies on social media to effectively reach and engage the general public during the emergency situations?

11. Can you provide examples of successful communication campaigns on social media that positively influenced public perception and response to the crises?
12. What measures did your organization take to ensure consistent and accurate messaging across various social media platforms?
13. In what ways did you leverage social media platforms to disseminate timely and critical information to the public during the floods? COVID-19?
14. How did your organization utilize social media for internal communication during the two situations?
15. What role did social media play in fostering collaboration and coordination within the organization during the response efforts?
16. Can you share examples of effective internal communication strategies on social media that facilitated smooth coordination among different departments or teams?

D. Information Dissemination Strategies

17. Can you describe the primary strategies your organization employed for disseminating information during the floods/COVID-19 through various channels, including social media?
18. How did your organization ensure the timely and accurate delivery of information to the public during the crisis situations, and what tools or platforms were typically utilized?
19. In what ways did you tailor information dissemination strategies to different audience segments, considering the diverse needs and preferences of the public during the emergencies?
20. Can you provide examples of challenges your organization has faced in the crises related to information dissemination, and how were these challenges addressed?
21. What measures did your organization have in place to maintain transparency and build trust with the public when sharing information on social media during crises?

E. Monitoring and Evaluation— Information Impact

22. How did your organization assess the impact of information shared on social media platforms during the flood/COVID-19 situations?
23. Can you discuss specific metrics or indicators used to measure the effectiveness of information dissemination on social media?
24. What role did feedback from social media monitoring play in shaping future communication strategies and crisis response efforts?
25. How did you differentiate between positive and negative impacts of shared information on social media, and what criteria did you use for evaluation?
26. Can you provide examples of instances where the impact assessment of shared information influenced decision-making or adjustments in your organization's emergency response plan?

F. Interaction with Affected Population - Dialogic Communication:

27. How did your organization actively engage with the general public on social media as a two-way communication platform during the two emergencies? Can you provide examples of successful dialogic communication instances?
28. What mechanisms did your organization have in place for collecting and analysing feedback from the public on social media, and how is this feedback utilized in the decision-making process?
29. Can you share experiences where tracking and replying to comments on social media played a crucial role in managing public perceptions and addressing concerns during a crisis?
30. In what ways did your organization leverage social media platforms to foster ongoing dialogue with the affected population beyond the immediate crisis period?
31. How did your organization prioritize and adhere to ethical guidelines and principles when communicating with the affected population?
32. Can you discuss specific protocols or practices your organizations followed to maintain the dignity and privacy of individuals while engaging with them on social media platforms?

Appendix E: Interview guide for participants: second round of data collection

Interview Guide: Social Media Challenges, Resources, And Capabilities of EDMOs

The following questions will serve as a guide for the conversation with respondents, allowing for potential rephrasing or probing in different ways.

A. Respondent's Details

RID:
Organization:
Contact Number:
Current Post:
Department/Area of Expertise:
Outline of major duties:

B. Social Media Challenges

1. What are the primary challenges your organizations faced in using social media for communication during the Accra floods/COVID-19, and how did you approach addressing these challenges?
2. Provide examples of instances where the need for change in social media communication strategies became apparent, and how did your organization adapt?
3. How does your organization foster a culture of continuous improvement in addressing evolving challenges associated with social media communication during crises?

C. Social Media Resources

4. What tangible resources, such as technology or equipment, does your organization require to optimize communication outcomes on social media during emergencies?
5. Beyond tangible resources, what intangible resources, like expertise or partnerships, are essential for effective social media communication in emergency response efforts?
6. How does your organization prioritize and allocate resources to ensure optimal utilization for social media communication during crises?
7. What specific skills do your social media personnel possess in terms of platform management and content analysis that contribute to effective communication during emergencies?
8. How does your organization actively build and maintain collaborative networks with stakeholders, government agencies, and community organizations to amplify the impact of social media communication during crises?
9. How are disaster communication protocols and guidelines integrated into your social media communication strategy, and how do they shape decision-making during crisis situations?

D. **Capabilities - Perceiving and Recognizing Changes**

10. How does your organization stay abreast of changes in the external environment, including technological advancements and public preferences, in the context of social media communication?
11. Can you share specific examples of how your organization has adapted its social media communication strategies based on changes in technology or shifts in public behaviour during emergencies?
12. What processes and routines does your organization have in place to ensure a proactive and dynamic response to emerging challenges and opportunities in social media communication?
13. Considering the dynamic nature of technology, how does your organization stay abreast of advancements and integrate new tools or platforms into its social media communication strategy?
14. How does your organization systematically gather and interpret information from social media and other sources to identify emerging trends, challenges, and opportunities during emergencies?
15. Can you share examples of instances where your organization effectively sensed changes on technology advancement and adapted communication strategies accordingly?
16. In the context of social media communication during crises, how does your organization quickly capitalize on opportunities or respond to challenges identified through the sensing process?
17. Can you provide examples of successful instances where your organization seized opportunities to enhance public engagement?
18. How does your organization foster a culture of continuous improvement and learning in adapting social media communication strategies over time?
19. What mechanisms does your organization have in place to facilitate the transformation of lessons learned from past emergencies into improvements in its capabilities for future crises?
20. How does your organization manage the reconfiguration of social media resources to respond to the evolving needs and challenges during crises?

Appendix F: Sample analysis table

Theme/Code	Sub-Category	Description	Example of Code Extract from the Transcripts
Social Listening	Information Gathering Strategies	Explores the strategies used by the EDMOs to gather information on social media platforms	*"Additionally, our organization actively engaged with the community through social media channels. We encouraged the public to share updates, photos, and personal experiences related to the Accra floods and the impact of COVID-19. This community-driven approach not only provided us with valuable firsthand information but also fostered a sense of collaboration and transparency..."*
	Information Searching, Cleaning, Verification and Analysis strategies	Studies how the EDMOs effectively managed the substantial volume of data generated on social media.	*"...in addition to hashtags, we employed a variety of search terms. For instance, location-specific terms like "Accra flooding updates" allowed us to capture a broader information beyond a single hashtag."*
	Addressing Biased and Misleading Information	Investigates how the EDMOs addressed biased information (e.g., worst-affected areas, grappling with power outages and damaged infrastructure may face challenges in accessing or contributing to social media, potentially skewing the information landscape) and misleading information such as fake news, rumours and hoaxes.	*"One of the key steps we took was the establishment of dedicated Facebook account and emergency hotlines as reliable sources of information on the floods. These platforms played a vital role in combating the spread of fake news and ensuring that accurate updates reached the public. Our Facebook account played a role in reaching a wider audience and engaging directly with the public. We actively managed these accounts, promptly addressing rumours, clarifying misconceptions, and providing accurate information in real-time. The hotlines provided a dedicated channel for communication, enabling us to swiftly respond to inquiries, provide accurate guidance, and address concerns."*
Communication Target	External Utilization	Studies the aspects of communication with the general public on social media.	*"Collaboration with social media influencers was another impactful strategy. Partnering with trusted figures allowed us to amplify our messages and reach a wider audience. These collaborations also added*

			credibility to our communication efforts."
	Internal Utilization	Explores the aspects of communication within the organization using social media.	*"First and foremost, we established dedicated internal WhatsApp groups which served as centralized hubs for disseminating real-time updates, sharing critical information, and fostering immediate communication among team members."*
Crisis Response	Information Dissemination Strategies	Examines the ways in which the EDMOs share information during emergencies and disasters.	*"...upon learning from news outlets that Accra would likely be affected by the storm, we promptly initiated the use of the hashtag #AccraFloods to alert communities about the anticipated heavy rains in the upcoming week. This hashtag gained widespread usage among news media and the general public. As the floods eventually occurred, we consistently employed the hashtag to provide clear updates and cautionary messages...."*
Monitoring and Evaluation	Information Impact	Accesses the impact of shared information on social media by the EDMOs.	*"...by providing updates on the virus transmission, preventive measures, and vaccination campaigns through social media, it helped raise awareness among the public about the severity of the pandemic and change in their behaviours. One notable outcome was the widespread adoption of mask-wearing, as individuals became more conscious of the importance of protecting themselves and others from the virus..."*
Interaction with Affected Population	Dialogic Communication	Studies how the EDMOs interact with the general public (feedback, tracking and replying to comments—social media as a two-way communication platform).	*"... social media served as a hub for information sharing not only from our end but also from the public as well. We requested people to shared their experiences and provide updates from their respective areas to know what support they required. This created a supportive platform for sharing information and collaborating on solutions. This level of engagement helped to build trust, as individuals felt that*

			their needs were being addressed."
	Ethical Considerations	Adhering to guidelines and principles in maintaining dignity and privacy during communication	*"...of course, sensitive information was handled with utmost care. We only shared necessary details without names and place of residence, ensuring that personal information is not disclosed in a way that could lead to stigmatization."*
Implementing Necessary Changes	Addressing Social Media Challenges	Investigates the problems faced by the EDMOs using social media for communication.	*"...one of the difficulties encountered during the floods pertained to power outages, which had a widespread impact on the entire region, leading to disruptions in the network infrastructure and consequently affecting our communication in various ways*."
	Securing Social Media Resources	Evaluates the tangible and intangible social media resources that EDMOs require to achieve optimal communication outcomes.	*"...our networks helped especially in amplifying our posts on COVID protocols. Resharing the posts ensured our messages reached a wider audience which allowed us to raise public awareness more effectively and encouraged people to take appropriate actions during the pandemic."*
	Dynamic Capabilities	Explores EDMOs' set of skills, processes, routines, and dynamic capabilities that are regularly used in perceiving and recognizing changes in the external environment, including technological advancements and public preferences.	*"We encourage continuous learning and information-sharing here. Regular training sessions and workshops are organized to keep our staff informed about the latest trends and technologies. Additionally, we emphasize the importance of open communication, where team members can share new insights and ideas they come across."*

Appendix G: A list of respondents for the interviews

RID	EDMO	Respondents	Main Focus of the Interviews
A1	A	Head, Communications	Social media communication, securing social media resources and dynamic capabilities
A2		Communications Assistant	Social media communication and securing social media resources
A3		Communications Assistant	Social media communication and securing social media resources
A4		Operations Assistant	Social media communication, securing social media resources, monitoring and evaluation
A5		Operations Assistant	Social media communication, securing social media resources, monitoring and evaluation
A6		Operations Assistant	Social media communication, securing social media resources, monitoring and evaluation
B7	B	Research and ICT Personnel	Social media communication, securing social media resources and dynamic capabilities
B8		Research and ICT Personnel	Social media communication, securing social media resources and dynamic capabilities
B9		Operations Officer	Social media communication, securing social media resources, monitoring and evaluation
B10		Operations Officer	Social media communication, securing social media resources, monitoring and evaluation
B11		Public Relations Officer	Social media communication, securing social media resources, monitoring and evaluation
B12		Public Relations Officer	Social media communication, securing social media resources, monitoring and evaluation
C13	C	Health Communications Officer	Social media communication, securing social media resources and dynamic capabilities
C14		Health Communications Officer	Social media communication, securing social media resources and dynamic capabilities
C15		Health Communications Officer	Social media communication, securing social media resources and dynamic capabilities
C16		Advocacy and Social Mobilization	Social media communication, securing social media resources, monitoring and evaluation
C17		Advocacy and Social Mobilization	Social media communication, securing social media resources, monitoring and evaluation
C18		Research and Health Policy	Social media communication, securing social media resources, monitoring and evaluation, dynamic capabilities
D19	D	Operations Officer	Social media communication, securing social media resources, monitoring and evaluation
D20		Operations Officer	Social media communication, securing social media resources, monitoring and evaluation
D21		Operations Officer	Social media communication, securing social media resources, monitoring and evaluation

D22		General Services Officer	Social media communication, securing social media resources and dynamic capabilities
D23		General Services Officer	Social media communication, securing social media resources and dynamic capabilities
E24	E	Intelligence Directorate	Social media communication, securing social media resources, monitoring and evaluation
E25		Communications Officer	Social media communication, securing social media resources, monitoring and evaluation, dynamic capabilities
E26		Communications Officer	Social media communication, securing social media resources, monitoring and evaluation, dynamic capabilities
E27		Communications Officer	Social media communication, securing social media resources, monitoring and evaluation, dynamic capabilities

Appendix H: Contextual background on the case disasters in Ghana

Floods in Ghana

Ghana has faced several severe flooding events, significantly affecting its urban and rural areas. Two notable instances are the floods of June 2015 and June 2021. In June 2015, Ghana experienced catastrophic flooding, particularly in the capital city of Accra. This disaster was triggered by torrential rains and the overflowing of major rivers, including the Tano and Volta rivers. The combination of heavy rainfall and poor drainage infrastructure led to widespread inundation. The floods caused extensive damage to homes, businesses, and infrastructure. Reports estimated that over 150 people lost their lives, and thousands more were displaced (Georgette, Alex & Kofi, 2023). The floods also disrupted essential services, including transportation and sanitation, exacerbating the humanitarian crisis. In June 2021, Ghana again faced severe flooding, primarily affecting the Greater Accra Region. These floods were caused by a combination of seasonal rains and inadequate drainage systems, which struggled to cope with the volume of water. The floods resulted in significant damage to properties, with many homes and roads submerged. The extent of displacement and casualties was less severe compared to 2015, but the floods still affected thousands of residents, highlighting ongoing challenges in urban planning and flood management in Ghana

COVID-19 Pandemic in Ghana

The COVID-19 pandemic, which began affecting global communities in early 2020, had a profound impact on Ghana, shaping public health responses and societal changes. Ghana confirmed its first COVID-19 cases in March 2020. The government swiftly implemented measures to curb the virus's spread, including partial lockdowns, mandatory mask-wearing, social distancing, and restrictions on public gatherings. As of mid-2024, Ghana has reported over 170,000 confirmed COVID-19 cases and approximately 1,400 deaths (WHO, 2024). The pandemic strained the country’s healthcare system, affecting the economy and daily life. In response to the pandemic, Ghana launched an extensive vaccination campaign, which by early 2024 had administered over 13 million doses. This effort has been crucial in controlling the spread of the virus and mitigating its impact on public health. Social media has played a pivotal role in Ghana throughout the pandemic, with platforms such as Facebook, X (Twitter), and WhatsApp being widely used for information dissemination, public health updates, and community support. Social media usage is

widespread in Ghana, with many residents relying on these platforms for news, communication, and updates related to the pandemic.