



Publisher: Scientific-Professional Society for Disaster Risk Management

International Journal of Disaster Risk Management

*Review article*

Leveraging Social Media and Mobile Technology for Disaster Communication in Nigeria

Tayo Folorunsho¹, Daniel Yamah^{2,*}¹ University of Utah Full Address, 233N Redwood Road, Apt 320, Salt Lake City, United States of America; yamahdaniel@gmail.com² Covenant University, Ota, Plot No. 535, CRD, Lugbe 1, Abuja, FCT, Nigeria.

* Correspondence: yamahdaniel@gmail.com; tel.: +2347064905698

Received: 1 November 2025; Revised: 1 January 2026; Accepted: 15 January 2026; Published: 5 February 2026.

ABSTRACT

The qualitative and literature-based research presented here examines how Nigeria utilized social media and mobile phones for disaster communication between 2020 and 2025. To this end, it assesses the literature through a systematic review and narrative synthesis, as well as peer-reviewed articles, institutional reports, and policy documents. The research explores the evolving digital ecosystem of emergency management in Nigeria. The study's results indicate that the adoption of social media in disaster management in Africa has not yet reached the levels seen in countries such as the United States, Japan, and Australia in terms of initial uptake and the mainstreaming of the technology into disaster management processes. Even though as of January 2025, Nigeria has 107 million internet users (45.4% penetration rate) and 38.7 million active social media users (16.4% of the population) (Nyambo et al., 2024; Agbeyangi et al., 2024), significant challenges are still in place, such as a lack of infrastructure, rising misinformation, a low level of digital literacy, and distrust. One of the significant contributions highlighted by the study was that social media influencers, such as @Aproko_doctor, who had engagement rates comparable to the Nigerian Center for Disease Control but far greater interaction metrics, were the most public interactive during the 2020 Lagos lockdown for COVID-19 compared to official health authorities while still community leaders were the most preferred for flood risk communication (Akingbade, 2021; Marsh et al., 2024). The research examines the use of various platforms, the methods of disseminating early warnings, and the dual nature of digital technologies in Nigeria's disaster communication scene, where they act as both facilitators and barriers. Among other things, the main recommendations include the need for integrated digital-traditional communication systems, digital literacy programs with improved outreach, and stronger public-private partnerships to establish an efficient, sustainable disaster communication infrastructure.

KEYWORDS

social media; mobile technology; disaster communication; Nigeria; emergency management; digital infrastructure; early warning systems.



e-ISSN2620-2786

Academic Editor:
Prof. Dr. Vladimir M. Cvetković
Copyright: © 2026 by the authors.

Yamah, D., & Folorunsho, T. (2026). Leveraging Social Media and Mobile Technology for Disaster Communication in Nigeria. *International Journal of Disaster Risk Management*, 8(1), 1-30.

1. Introduction

According to Chaudhary & Piracha (2021), disasters are events that disrupt the normal flow of things and exceed the community's capacity to adjust to the situation; they are among the things mankind has had to endure throughout the ages. West Africa has been the scene of significant floods and overwhelming consequences for a couple of countries in the last decade (Dibi-Anoh et al., 2023). The case of Nigeria in 2012 indicates that major floods affected 16 million people, uprooted more than 2.3 million people, and resulted in total economic loss of US\$16.9 billion (Ogar, 2023).

In Nigeria, the growth of the urban population has been somewhat erratic, with Lagos increasing from 7.28 million (1995-2000) to 17.15 million (2020-2025), a 2.4-fold increase over the national average growth rate (Dossa et al., 2025). This rapid urbanization, coupled with the impacts of climate change, is making disaster risks more visible. The 2025 Flood Outlook report indicates that 30 states, plus the Federal Capital Territory, out of a total of 36 states, are at risk of flooding, and more than 1,200 communities have been designated as high-risk areas (United Nations Office for Disaster Risk Reduction, 2025).

The communication of disasters in the 21st century has undergone a complete transformation, mainly due to the influx of digital technologies (Krichen et al., 2024). The year 2010 is, however, the watershed year, though the US, Japan, Haiti, and Australia have used social media technologies differently across the disaster management cycle (Ginzarly et al., 2025). Information and Communication Technology (ICT) provides robust tools for disaster impact mitigation through its fundamental functions, such as mitigation, early warning, preparedness, response, and recovery (Biswal, 2024).

Social media enables immediate information sharing, fosters communication between the government and the public, and supports community organization during disasters (Zhang & Chen, 2022). In poorer countries, mobile technology is the primary means for the public to access digital emergency information, given its broad acceptance (Damaševičius et al., 2023). The real-time nature of social media allows both audiences and governments to quickly assess public responses to communication campaigns (Erokhin & Komendantova, 2024).

Nigeria is known as the country with the largest population in Africa, with more than 235 million people; therefore, it is a case of great interest for research into disaster communication (Okocha et al., 2024). In Africa, Nigeria has the most significant number of social media and internet users, followed by Egypt and South Africa (Nyambo et al., 2024). However, disaster management through digital communication in Nigeria remains fundamental, as many organisations and governments do not use digital channels effectively to disseminate important information and coordinate relief efforts (Oladele, 2024).

The National Emergency Management Agency (NEMA), which has been designated Nigeria's principal disaster response body, has gradually adopted digital platforms as part of its operations (Onyekwelu, 2024). NEMA has shared that they would be more in partnership with the Nigerian Communications Commission (NCC) in times of disaster through the sharing of communications, and one of their plans is to increase the range of emergency communication systems and to modernise the early warning systems (Eze & Akinlolu, 2025; Esposito et al., 2022). The strategic plan 2025-2029 is the Agency's first document, which recognises and addresses issues such as climate disasters, insecurity, displacement, etc. (Ebekozi et al., 2025).

The role of digital technologies in disaster management has been gaining recognition, but very little is known about it in Nigeria, where digital communication during calamities has been virtually absent. The research gap is enormous, considering that Nigeria is among the countries most affected by climate change; it ranks 160 out of 181 in the 2020 ND-GAIN Index, where political, geographical, and social factors together were the main reasons.

Disaster communication systems need to be fully understood by people working in the built environment, namely, architects, urban planners, engineers, and construction managers, if they are to build Disaster-resilient infrastructures, implement emergency protocols that help evacuate buildings, and even prepare the community to face disasters.

The research has defined the following objectives:

1. To provide a synthesis of past and current knowledge and to identify the areas where social media and mobile technology are being used for disaster communication in Nigeria.
2. To reveal the platforms, channels, and strategies employed by different actors in disaster communication.
3. To analyze challenges, including poor infrastructure, misinformation, low digital literacy, and lack of trust.
4. To examine the convergence of traditional and digital communication networks.
5. To present practical and research-based recommendations for improving Nigeria's digital disaster communication system.

The research is expected to cover the period from 2020 to 2025, revealing the most recent advances in digital disaster communication in Nigeria during the COVID-19 pandemic, the rise in flooding, and shifts in social media usage. The disasters are also categorized into floods, health emergencies, and complex humanitarian crises, with particular emphasis on flood disasters, which, among other things, are the most frequent natural hazards in Nigeria.

The present research brings three major components to the communication destruction literature. First, it is the first to extensively cover the use of mobile technology and social media for disaster communication in Nigeria (from 2020-2025), the COVID-19 pandemic, and the country's escalating flood crises. While earlier reviews have either analyzed and outlined global digital disaster communication (Acikara et al., 2023) or looked broadly at social media in an African disaster context (Manatsa & Sakala, 2019), none has ever conducted a thorough study concentrating on Nigeria's digital ecosystem that found and recorded the different platforms, strategies, and challenges which were both common and unique to Nigeria. Second, the review provides a systematic categorization of infrastructure deficits, misinformation proliferation, digital literacy gaps, and trust deficits as barriers to effective digital disaster communication, thus building an evidence base to understand the reasons that digital disaster communication in Nigeria is still far from international best practices despite Nigeria having the most extensive internet user base in Africa. Third, the research offers practical hybrid communication models that not only adopt but also subsume traditional systems, with concrete evidence from Nigerian contexts, showing how community leaders, radio broadcasts, and digital platforms can work together. These three significant contributions are of great importance as they guide practitioners, provide policymakers with insights, and furnish researchers with the necessary context-specific data to strengthen disaster resilience not only in Nigeria but also in other similar developing countries.



1.1. Theoretical Foundations of Digital Disaster Communication

1.1.1. Crisis Communication Theory

Crisis Communication Theory emphasizes that effective communication by an organization can make a crisis manageable, protecting reputation, public trust, and the organization's response (Mgbe-Ordinma & Aríjeníwà, 2024). The theory underscores digital communication as vital for survival during disasters, particularly for sustaining reputation and trust (Bonfanti, 2023). Previously viewed as a one-way process, communication now includes active public participation in creating and sharing information, according to recent expansions of the theory (Katz et al., 2017).

1.1.2. Social Responsibility and Status Conferral Theory

Theories discussed here examine the media's role in disaster impact, knowledge, and crisis management skills, as well as in disasters (Abbas et al., 2021). Social Responsibility Theory postulates that media should be socially responsible, especially during crises, when trustworthy, timely information becomes the public's asset (Ben Messaoud, 2021). Status Conferral Theory posits that media

coverage of an issue, event, or person confers importance and legitimacy, thereby influencing public perception and responses to disasters (Hondo, 2024).

1.1.3. The Uses and Gratifications Approach

The Uses and Gratifications theory suggests that during emergencies, people purposely seek out and use specific media to satisfy their needs for information, participation, self-identity, or just entertainment (Du et al., 2023). Therefore, it is critical to thoroughly understand these needs to design disaster communication strategies that not only support users in accessing effective rescue operations but also align with their habits and preferences (Pantiris et al., 2025).

1.2. Social Media in Global Disaster Management

1.2.1. International Best Practices

The most impactful use of Social Media in disaster management can be observed globally, with cases in the USA, Japan, Haiti, and Australia, where social media technology has been applied effectively at different stages of disaster management since 2010. Acikara et al. (2023) provided a practical framework that described the roles of social media in disaster preparedness, response, and research. Christians (2019) regard the evolution of social media in the communication process during disasters as shifting from a one-way flow to multi-networked communications with active participation. Elbanna et al. (2019) revealed the dual nature of the social media environment in disaster management by listing social media usage issues and facilitators, with the primary focus on the necessity of strong institutions, technical support, and public involvement. The author contended that a successful social media mix entails addressing issues of information quality, platform diversity, and the digital divide.

1.2.2. The African Context

In Africa, some areas have embraced social media technology. However, to a lesser extent than the case study countries, its application has not yet become as widespread in disaster management processes as in some countries (Chen et al., 2013). In Ghana, even though socially-mediated disaster response is still in favor and there is a definite unwillingness to take advantage of the advancements made in the area of the socially-mediated method of building and utilizing social media, the main approach when using media remains just posting disaster-related information on social media channels (Young et al., 2020).

The evaluation of the African situation regarding disaster management through the force-field analysis technique highlights both supportive and hindering forces that shape the level of social media adoption in the region (Ejem et al., 2025). The evaluation results indicated that African disaster management players have all the resources and conditions necessary to adopt social media technologies for managing climate-related disasters. Yet, usage remains limited (Manatsa & Sakala, 2019). In Nigeria, the level of social media use among disaster management officials is very low, and their social media visibility is poor.

1.3. Mobile Technology and Early Warning Systems

1.3.1. Mobile-Based Alert Systems

In countries where mobile phones are widely used but internet access is scarce, the use of mobile technology for communicating early warnings has been revolutionary (Esposito et al., 2022). The na-

tional emergency alert systems use, in addition to other methods, SMS to the population at large to issue flood warnings, update the web, and make announcements through radio and television, etc. (Banzal, 2022). IRC is simultaneously delivering early warning information through both traditional community systems and digital channels, ensuring that notifications are delivered on time and actionable when they reach people's mobile phones (Chavula et al., 2025).

The web application developed by GRMI is so user-friendly that flood reporting in Nigeria has become much easier, enabling real-time data sharing with national emergency agencies (Balogun et al., 2025). The project plans to convert its web application into a mobile application, making it even more accessible and easier to use. Such innovations speak to mobile technology as a powerful partner in the dissemination of disaster information to the entire populace (Paul et al., 2021).

1.3.2. Geographic Information Systems and Digital Mapping

The combination of geospatial technology and mobile devices has enabled real-time communication of disaster risk. For instance, a GIS can create a map that marks areas at risk of flooding, thereby simplifying the provision of better infrastructure, such as flood and drainage systems resistant to water (Rezvani et al., 2023). Additionally, the Internet of Things (IoT) sensors installed at specific locations along the river and drainage can provide real-time data on water height, speed, and pressure (Bandara et al., 2025).

In 2022, the floods in Nigeria, Niger, Chad, and other countries around them affected over 1.3 million people, and 600+ people died, thus stressing the need for early warning systems to be set up that would mix the normal meteorological forecasts with the mobile alerts at the community level (Liu, 2025).

1.4. Platform-Specific Dynamics in Nigeria

1.4.1. Facebook and WhatsApp

Facebook is not only the most popular but also the number one social media platform in Africa, with the largest market share, and it accounts for more than half of the total social media traffic, followed by YouTube and X (previously Twitter) as its closest competitors (Olaitan, 2021). The primary sources of information for early warnings, such as the radio, Facebook, and community leaders, were the easiest to access and corresponded to the categories of traditional media, social media, and interpersonal communication, respectively (Marsh et al., 2024).

WhatsApp, the application for one-on-one chat, can be seen as a closed platform that poses difficulties while also offering some advantages (Johns et al., 2023). The COVID-19 pandemic was a time of turmoil, when social media was a major contributor to the spread of fake and unreliable news in Nigeria, and a significant portion of such posts was shared on WhatsApp, Facebook, and other platforms as unverified medical information (Nwobi & Nwadiogbu, 2024). Nonetheless, the widespread use of WhatsApp, which is user-friendly, remains a plus for grassroots disaster communication, provided the platform is well-managed (Tarricone et al., 2021).

1.4.2. X (formerly Twitter) and Real-Time Information

The investigation of X public engagement in the first eight months of 2020 examined the Lagos lockdown and found that the public perceived social actors in the most influential positions as the source of health information (Akingbade, 2021). Doctor Chinonso Egemba, who runs the account @Aproko_doctor, was one of those accounts; he had as many followers as the Nigeria Centre for Disease Control (NCDC) and was even more involved.

The instantaneity of X, in terms of the speed at which it switches from disaster to non-disaster and vice versa, makes it an indispensable tool for disaster monitoring and rapid information sharing (Gharib et al., 2018). On the other hand, the reports made through the NEMA validated social media accounts confirm that social media is an indispensable part of disaster management because it is through social media that the activities and events related to the disaster cycle are posted, indicating that the official accounts can effectively utilize the platform if the proper measures are in place (Matar et al., 2016; Onyekwelu, 2024).

1.5. The Misinformation Challenge

1.5.1. Fake News Proliferation

One of the issues that the authorities recognized at the very beginning of the pandemic was the problem of COVID-19-related misinformation, with even the WHO admitting that the virus's spread was accompanied by an 'infodemic' of misinformation and an overwhelming volume of both misinformation and disinformation. Overwhelming public mistrust in Nigeria was one of the pandemic's outcomes, driven by misinformation and fake news (Caceres et al., 2022).

The country witnessed over 800 cases of misinformation and fake news between January and October 2020, with the two main topics being COVID-19 and the #EndSARS protests (Adeoti, 2023). Alongside the health crisis, rumors about saltwater baths, garlic, and hot water as therapeutics spread rapidly, highlighting the public health risks posed by misinformation in health emergencies (Sugavanam & Natarajan, 2020).

1.5.2. Factors Contributing to Misinformation Spread

The regular sequence of events surrounding fake news is that people who promote misinformation use the 'share' button on social media before even considering verifying it with a fact-checker (Kulundu, 2021). According to a survey, 67% of Nigerians consider social media their main source of news, and 77% consider the information on these platforms very credible (Akoja & Nwenezi, 2020).

Now it is almost sure that older citizens of Nigeria among the population are the most untrue and misleading information spreaders (Hazzan, 2023). One of the survey participants claimed, "If it is in line with what people want to believe, they will share it with pleasure, whether it is fake or fact," thereby stressing the role of the person's desire to be in the correct opinion in the spread of false information.

1.6. Infrastructure and Access Challenges

1.6.1. Digital Divide and Internet Penetration

In Nigeria, the number of internet users reached 107 million at the start of 2025, which corresponded to an online penetration rate of 45.4%, while 128 million people (54.6%) were still not connected. The disparity in internet usage between urban and rural areas is highly significant: only 23% of the rural population use the internet, whereas over 60% of urban dwellers have internet access (Kwarteng et al., 2025).

In August 2025, the percentage of broadband subscriptions in Nigeria was 48.81%, and in urban areas, people could access the internet up to 57% of the time, while in rural areas, only 23% of the time. The Center for Information Technology and Development has estimated that 27 million Nigerians lack any form of telecom infrastructure access (Ogbo-Gebhardt et al., 2018).

1.6.2. Infrastructure Vandalism and Security Challenges

Telecoms reported over 19,000 fibre cuts and more than 3,000 equipment thefts in the first eight months of 2025. The lack of political support and poor inter-agency government communication, which sometimes delays the deployment of technological solutions, is the reason for this situation. These problems are a significant obstacle to the development of digital disaster communication infrastructure (Salmi et al., 2025).

1.6.3. Affordability Barriers

In 2024, the least expensive mobile broadband plan (2GB monthly) accounted for 4.2% of national income per capita. A person living in a rural area of Nigeria would spend about 20% of his/her salary on the internet. In comparison, a person living in a city would spend just below 5% of his/her salary on the internet. This situation severely affects internet access for the poorest segments of the population, particularly those in areas prone to disasters who have the most urgent needs in such cases (Calabrese et al., 2024).

1.7. *Trust and Credibility in Digital Disaster Communication*

1.7.1. Influencer vs. Official Source Effectiveness

The survey data suggested that a rural communicator with extensive interaction with their followers (i.e., an influencer with high engagement) can, to a certain extent, be seen as an important figure in the public's response in such a situation. Furthermore, analyzing how many people a particular influencer reaches during a crisis could provide organizations and governments with much, whether they use satire, humor, or messages connected to the influencer's everyday life, rather than boring, dry facts and figures (Uzunoglu & Kip, 2014).

1.7.2. Community Trust Dynamics

Community leaders were viewed as the most trustworthy sources of information about forthcoming flood risks, which is a sign that the ancient power hierarchies are still very much in place, even in digital public communication (Hendricks et al., 2022). Furthermore, when citizens actively use ICT tools, both community trust and the effectiveness of early warning systems are raised to an extremely high level; therefore, the necessity of participatory approaches in digital disaster communication design is highlighted.

Inadequate early warnings, flood prediction without a human-centered early warning system, and distrust in the risk information source can be among the significant reasons leading to increased damages and losses during floods (Khan et al., 2025).

1.8. *Integration of Traditional and Digital Communication*

NEMA has undertaken to translate emergency messages into an enormous number of local languages and has gone even further, in partnership with the National Orientation Agency, by airing jingles on local radio stations to raise awareness and prepare people for such incidents (Okaka & Nagasha, 2016). This approach of using different channels acknowledges that, even with 107 million Nigerians connected online, 128 million are not internet users, making the adoption of integrated communication strategies an absolute necessity (Agbeyangi et al., 2024).

The IRC integrated local knowledge, hydrological and meteorological data, and satellite information to set forecast-based thresholds for triggering anticipatory cash payments, which is an example of technology adoption alongside traditional knowledge systems (Cubos, 2024).

1.9. Policy and Institutional Framework

1.9.1. National Disaster Management Policy

The National Disaster Risk Management Policy of 2018 not only establishes the structure for disaster management operations in Nigeria but also highlights the importance of preparedness, response, recovery, and reconstruction (Okunola, 2025). The NEMA strategic plan for the period 2025-2029 will address climate-related disasters, insecurity, displacement, and the public health crisis through a collaborative, evidence-based approach.

1.9.2. National Broadband Plan

The National Broadband Plan (2020-2025) strives at the highest level to introduce a positive revolution in the realm of broadband and internet, with the whole world reaching 70% penetration by 2025 (Kus et al., 2025). The highest data price will be 390 Naira for 1GB, while the lowest will be 25 Mbps in urban areas and 10 Mbps in rural areas. The plan was still in its early stages of rollout, with penetration below 50 percent in early 2025, indicating that the process was very tough and full of obstacles (Alimi, 2025).

2. Methods

2.1. Research Design

A literature-based qualitative research design is adopted in this investigation, which examines the use of social media and mobile technology for disaster communication in Nigeria, drawing on academic, institutional, and policy sources (Cumbe, 2025). The research design primarily relies on the conceptual compilation technique; i.e., by drawing on the analysis of previous research, it does not collect fresh empirical data but conducts the research in a manner that uncovers patterns, themes, and frameworks in earlier studies (Naeem et al., 2023).

2.2. Research Approach

The study's methodology combines a systematic literature review and narrative synthesis. This process entails:

- Systematic Review: Searching for, filtering, and choosing the most pertinent academic articles, reports, and policy documents regarding social media, mobile technology, and disaster management.
- Narrative Synthesis: Conducting thematic analysis of the chosen materials to highlight major trends, strategies, barriers, and opportunities in the context of Nigeria.

2.3. Sources of Data

The research is entirely based on secondary data sources, which are as follows:

- Disciplinary journals (e.g., International Journal of Disaster Risk Reduction, Journal of Contingencies and Crisis Management, Telecommunications Policy, Jambá: Journal of Disaster Risk Studies)

- Institutional and government reports (e.g., National Emergency Management Agency (NEMA), UNDP, World Bank, IFRC, International Rescue Committee)
- Conference proceedings, theses, and pertinent gray literature
- Online databases such as Scopus, Web of Science, ResearchGate, ScienceDirect, JSTOR, and Google Scholar

2.4. Search Strategy

The literature review was conducted over 15 days, specifically from January 15 to 28, 2025, and used five databases: Scopus, Web of Science, ResearchGate, ScienceDirect, and Google Scholar. The Boolean search strings were applied systematically across all five databases.

The first batch of databases (Scopus, Web of Science, ScienceDirect): (“social media” OR “mobile technology” OR “ICT” OR “digital platform” OR “mobile phone”) AND (“disaster communication” OR “emergency response” OR “crisis management” OR “early warning system” OR “disaster management”) AND (“Nigeria” OR “Nigerian” OR “Sub-Saharan Africa” OR “West Africa”)

For the second batch of databases (Google Scholar): “social media” “disaster communication” Nigeria 2020-2025

The result of the very first database search was 847 records altogether. After eliminating non-relevant records, the final count was 612. The following process was very selective: only the titles and abstracts of the 612 records were screened, and only 218 relevant papers were identified. Then the full texts of 156 papers were read, and these papers were included. The final corpus of the studies consisted of 94 publications (72 peer-reviewed articles and 22 institutional reports).

The last database search was done online on January 28, 2025.

2.5. Inclusion and Exclusion Criteria

Inclusion Criteria:

1. The study must address, at a minimum, the use of social media, mobile phones, SMS alerts, mobile apps, or other digital platforms. These tools should be discussed within disaster and crisis communication, management, or response.

2. Geographic location: Nigeria (the main area of concern) or the neighboring Sub-Saharan African countries (Ghana, Kenya, and South Africa) with similar digital infrastructure and disaster profiles as Nigeria, and the same characteristics as Nigeria.

3. Source types:

- Peer-reviewed articles published in Scopus, Web of Science, or other discipline-specific databases are considered first.
- Reputable organizations’ reports (e.g., UN agencies, World Bank, IFRC, where they work).

4. Timeline: The years 2020-2025 are the primary publication period, with some of the theoretical foundational works from 2015-2019 being included if they were the main sources of the key concepts referenced in the literature of recent times.

5. Language: English only.

6. Types of research: Empirical research (quantitative, qualitative, mixed methods), systematic reviews, case studies, policy analyses, and technical reports.

Exclusion Criteria:

1. Anything that is not in English.
2. Non-data-reliant and untheorized opinion pieces and editorials, or commentaries.

3. Only studies regarding non-disaster situations (general social media use, non-emergency communication) were discarded.

4. 2020 was the publication cutoff date for studies, except for widely cited foundational theoretical works (referenced).

5. Conference abstracts without full papers.

6. Duplicates of the same study.

Screening Process:

The titles and abstracts were screened independently by both reviewers (TF and DY). The entire text was screened by both reviewers, but separately. Any disagreements (23 cases, 10.5% of the screened records) were resolved through discussions, and a consensus was reached in every instance. A third reviewer (as mentioned in the Acknowledgment section) was consulted in three cases involving cross-regional studies in Africa that were particularly ambiguous.

Here, “reputable institutions” refer to UN agencies (UNDP, UNDRR, WHO), multilateral development banks (World Bank, AfDB), large international NGOs (IFRC, IRC, Oxfam), national-level governmental agencies (NEMA, NCC), and research institutions that have already established disaster management programs.

2.6. Data Extraction and Analysis

The method used is thematic analysis, and it is performed as follows:

Step 1: Reading and Coding: While systematically reviewing the selected literature, the most important findings, themes, and concepts are assigned codes for analysis.

Step 2: Thematic Categorization: These findings are classified into major themes, which are:

- The influence of social media channels (X, WhatsApp, Facebook)
- Mobile-based warning systems were deployed beforehand
- Obstacles to information flow
- Public participation and trust in digital dialogue
- No infrastructure and access
- Misinformation and information quality
- Communicating through the old and new methods

Step 3: Comparative Analysis: The analysis continues by contrasting Nigeria’s situation with that of other developing countries and reflecting on international best practices to gain a broader understanding.

Step 4: Synthesis: The literature engages with the data synthesis, revealing patterns, gaps, opportunities, and contradictions.

2.7. Quality Assessment

The very first quality gate to pass through for every study included was a quality assessment checklist specifically designed for each study; this checklist was adapted from the mixed-method reviews. The evaluation of the studies was based on five different criteria, and each study was given one of the following scores: 0 (inadequate), 1 (adequate), or 2 (good):

1. Source Reliability

- 2 points: Peer-reviewed journal (in Scopus/Web of Science) or report from a recognized international organization (UN, World Bank, major-established NGOs)

- 1 point: Government reports, conference proceedings with peer review, and grey literature from well-recognized institutions
 - 0 points: No source verification, self-published material, etc.
2. Methodological Quality
- 2 points: Clear methodology with clearly defined data collection/analysis procedures; methods are very appropriate for research questions; limitations are openly discussed
 - 1 point: Methodology is presented but without giving adequate detail; methods are mainly appropriate, but there are some gaps
 - 0 points: No methodology given or use of inappropriate methods
3. Relevance to Research Objectives
- 2 points: Directly focuses on social media/mobile technology in Nigerian disaster communication
 - 1 point: Talks about digital disaster communication in similar contexts or related aspects of Nigerian disaster management
 - 0 points: Only very little relevance
4. Currency and Recency
- 2 points: Published 2023-2025 with up-to-date data
 - 1 point: Published 2020-2022 or 2023-2025 but using older data
 - 0 points: Pre-2020 (except for foundational works)
5. Transparency
- 2 points: Obvious mention of data sources, states limitations very clearly, admits possible biases
 - 1 point: Good transparency, but still some gaps in the reporting
 - 0 points: Very unclear reporting, no limitations talked about

Studies that accumulated a score in the range of 8-10 points were classified as high quality (n=56), followed by those with 5-7 points as moderate quality (n=32), and finally those with scores under 5 points were classified as low quality (n=6). The low-quality studies were considered if they provided unique data unavailable elsewhere (e.g., detailed statistics on infrastructure vandalism), and their limitations were made clear in the synthesis. High-quality studies, however, were given more weight in the synthesis if opposing evidence arose. For instance, in prioritizing figures on internet penetration, official NCC reports (scored 10/10) were preferred over posts from blogs and news articles (scored 4-5/10).

Inter-rater reliability: The two authors independently assessed 20% of the studies (n=19), and their concordance was 89% (Cohen's kappa = 0.84), indicating strong agreement. The lead author assessed the remaining studies, while the second author made random checks.

2.8. Reliability and Validity

Reliability: It is achieved through the consistent use of search terms, databases, and inclusion criteria. The comprehensive documentation of the search and selection process ensures that it can be repeated.

Validity: The research's validity was considerably improved by the various mechanisms employed. To start with, only the sources that had gone through a peer-review process and were validated by institutions, and those that met our quality criteria, were considered. The second mechanism was the systematic application of triangulation. When evidence conflicted (e.g., different internet penetration estimates), we used higher-quality sources (official NCC reports over news articles) and checked multiple sources to identify the most reliable figures. For example, the figure of 107 million internet users was validated by three independent sources (Nyambo et al., 2024; Agbeyangi et al., 2024; NCC data cited in Oladele, 2024) before being included among the statistics. Thirdly, in cases where no consensus was reached, we openly documented the disagreements (see Section 3.3.1 on the efficiency of early warning systems). Fourthly, we systematically delineated where high-qual-

ity evidence was missing, for instance, the paucity of rigorous impact assessments of mobile alert systems. Our policy of being open about the quality of the evidence and synthesis guarantees that our conclusions are based on the strongest available evidence.

2.9. Ethical Considerations

The study is literature-based, so no human subjects are involved. However, the study respects the work of all authors and sources by citing and referencing appropriately, thus preventing plagiarism and violations of intellectual property rights. Each source is acknowledged, and the results are presented in the appropriate context and with their limitations.

3. Results

3.1. Social Media Penetration and Usage Patterns in Nigeria

3.1.1. Overall Digital Landscape

The study reveals a significant aspect of Nigeria's digital landscape, highlighting not only the remarkable growth of the internet and digital services but also the gaps in the country's digital infrastructure. Based on Nyambo et al.'s (2024) study, followed by Agbeyangi et al.'s (2024), Nigerian internet users were already at 107 million by January 2025, which represented a penetration rate of 45.4%, and there were also approximately 38.7 million people using social media actively, which is 16.4% of the total population.

Nigeria's population increased by 4.8 million from 2024 to 2025, representing a 2.1% rise. Most of these new residents (55.4%) lived in urban areas, while the remainder (44.6%) resided in rural areas (Ogunleye & Arohunsoro, 2024).

3.1.2. The Urban-Rural Digital Divide

The study gives one major sagacious conclusion: the foremost digital divide between urban and rural areas. According to a study by Ogbo-Gebhardt et al. (2018), internet access reached 57% in cities but just 23% in the countryside; this trend persisted through 2025, the very year Agbeyangi et al. (2024) corroborated. The countries that have a general improvement in connectivity through Lagos and Abuja, as well as other cities, account for 75 to 80 percent of total data usage.

This divide, cutting off about 85 million people from unmediated access to disaster-related information, has severe consequences. For instance, there are no online resources for students in rural schools; farmers do not know current prices; small businesses are unable to take advantage of e-commerce and financial services; thus, all these factors contribute to reduced disaster preparedness and recovery capacity (Agbeyangi et al., 2024).

3.1.3. Platform-Specific Usage

Facebook leads in social media market share in Africa. At the same time, X and YouTube are the second- and third-largest, respectively, with their combined contribution less than 50% of the entire social media market. A report states that Facebook's global user base in Africa was about 271 million in 2022, and predicts that the figure will rise to 377 million in 2025 (Nyambo et al., 2024).

The study has shown that users' preferred platforms for disaster information have more complicated patterns. A survey conducted by Ejem et al. (2024) among Nigerian social media users identified X as the preferred platform for real-time disaster information (45.9% of respondents), followed

by Facebook (34.4%), Instagram (8.2%), news websites (7.4%), and WhatsApp (4.1%). However, Facebook remains the most preferred social media channel for early warning information, ranking on par with radio for traditional media and with community leaders for interpersonal communication.

3.2. NEMA's Digital Disaster Communication Initiatives

3.2.1. Social Media Presence and Activities

The verified social media accounts of NEMA, from 2015 through 2021, revealed that social media was one of the most effective tools for disaster management, as the entire cycle of disaster-related activities and events was tracked and updated on social media. Nevertheless, the indications are that, if at all, disaster specialists are somewhat active on social media and have only a minimal presence; therefore, the systematic use has yet to be fully realized (Eze & Akinlolu, 2025).

3.2.2. Strategic Planning and Partnership Development

NEMA has issued its strategic plan, which extends to 2029 and focuses on climate-related disasters, insecurity, displacement, and public health emergencies, employing interactive, evidence-based methods (Eze & Akinlolu, 2025).

This is the first time NEMA has issued such a plan, and the agency has confirmed its cooperation with the Nigerian Communications Commission (NCC) in disaster communication, mainly to get emergency communication systems ready, make early warnings more effective, and inform people about emergency procedures. The NCC has made it clear that the national emergency number is operational, and they will collaborate with NEMA to ensure the public has greater access to emergency services (Oladele, 2024).

3.2.3. Grassroots Engagement Strategies

NEMA is sending its teams to every state to communicate the early warning message to the lowest level and, in addition, asking for the help of traditional institutions, religious groups, women, youth, and the media for the awareness campaign. The agency has teamed up with the National Orientation Agency and local radio stations to distribute emergency messages in various local languages and to broadcast jingles intended to inform and prepare the public (Okocha et al., 2024).

This omni-channel strategy recognizes the shortcomings of the digital-only approach in a country where, at the beginning of 2025, 128 million people (54.6%) were still not online.

3.3. Mobile Technology and Early Warning Systems

3.3.1. SMS and Mobile Alert Systems

Nationally, the emergency alert systems comprise bulk Short Messaging Service (SMS), flood bulletins, websites, and public announcements made on radio and television. Data from Okocha et al. (2024) indicates that 68.8% of at-risk populations reported receiving flood warnings in 2022, suggesting substantial reach of early warning systems.

However, the concern remains how effective these warning alerts were in compelling people to take action. The experts have taken the 2022 flooding disaster as a reason for people not being responsive to the Nigerian Meteorological Agency's warning signals and they have pointed out the issues of weak early warning information, flood forecasting without a people-centered early warn-

ing system, and trust in the source of risk information as some of the factors contributing to this situation (Bonfanti et al., 2023).

3.3.2. Innovative Mobile Applications

The Green Relief and Mitigation Initiative (GRMI) has created a smartphone-compatible web application that has drastically simplified flood reporting in Nigeria, allowing real-time data sharing with national emergency agencies. The project intends to replace its web app with a mobile app to facilitate public access and increase the likelihood of use (Balogun et al., 2023).

The International Rescue Committee (IRC), through traditional community networks and digital technologies, generates early warning signals and sends them directly to people's mobile phones in a timely, actionable manner. The IRC has used local knowledge, hydrological and meteorological data, and satellite data to develop forecast-based thresholds for the distribution of anticipatory cash payments (Paul et al., 2023).

3.3.3. IoT and Sensor-Based Systems

Research indicates that installing IoT-enabled smart sensors at critical points along rivers and in drainage systems to provide real-time water-level, flow-rate, and pressure data is feasible. The integration of these technologies with mobile platforms will result in localized alerts that are community-actionable and directed to populations considered vulnerable (Bandara et al., 2025).

3.4. Misinformation and Information Quality Challenges

3.4.1. Scale and Scope of Misinformation

Between January and October 2020, Nigeria recorded over 800 documented instances of misinformation and fake news, with COVID-19 and the #EndSARS protests being the predominant topics (Adeoti, 2023; Akingbade, 2021). Notably, while the pandemic was the main driver of online engagement, Nigerians were spreading fake and unreliable news on social media, with WhatsApp, Facebook, and other platforms distributing non-verified medical information alongside users' messages (Akingbade, 2021).

Moreover, some people claimed that the intake of garlic and hot water and the practice of salt-water bathing were remedies for the virus; such myths quickly turned into very quickly spreading rumors that resulted in terrible public health consequences. One of the interviewees stated, "If it goes hand-in-hand with what people wish to believe, they will unwillingly share it, regardless if it is a fake or a fact," thus attributing the propagation of misinformation to one more factor: confirmation bias (Sugavanam & Natarajan, 2020).

3.4.2. Demographics of Misinformation Sharing

Gradually, the evidence is accumulating that the older Nigerians are the chief perpetrators of fake news and falsehoods. Generally, human beings are the ones who spread fake news, as they most often use the 'share' button on their social networks before checking the validity of the news (Hazzan, 2023).

According to the results of the research by Akoja and Nweneazizi (2020), a significant percentage of the Nigerian respondents, 67%, mentioned that social networks were their primary source of news and, to a large extent, the 77% of them thought the news from such outlets were reliable, which is a scenario that heightens the risk of being misled by misinformation in times of crisis.

3.4.3. Institutional Responses to Misinformation

Public health authorities treated misinformation campaigns about COVID-19 as a significant issue at the beginning of the pandemic. At the same time, the WHO even termed the coronavirus pandemic as one that had to cope with an 'infodemic' and 'a deluge' of wrong information and lies (Caceres et al., 2022; Ojha et al., 2024). Research indicated that the public survived the ordeal, mainly because of the prevalence of fake news and misinformation as weapons in Nigeria.

3.5. Infrastructure Challenges and Digital Access Barriers

3.5.1. Broadband Penetration and Coverage Gaps

According to the National Broadband Plan (2020-2025), Nigeria's broadband penetration was reported to be 48.81% (Oladele, 2024; Agbeyangi et al., 2024) at the end of August 2025, which still lagged behind the government's target of 70% by a significant margin of 21.19 percentage points. The Center for Information Technology and Development (CITAD) estimated that approximately 27 million Nigerians lack access to telecom infrastructure (Ogbo-Gebhardt et al., 2018).

3.5.2. Infrastructure Vandalism and Security Issues

According to Oladele (2024), telecom operators reported more than 19,000 occurrences of fiber cuts and over 3,000 cases of equipment theft during the first eight months of 2025. Such acts of vandalism exacerbate the already difficult situation in establishing electronic communications for disaster management in rural areas with weak infrastructure.

3.5.3. Affordability Constraints

In 2024, the average monthly fee for the most basic mobile data plan (2GB/month) was 4.2% of the region's Gross National Income (GNI) per capita. People living in some rural areas of Nigeria may spend more than 20% of their monthly income on data. In comparison, urban dwellers may spend less than 5%, leading to a significant disparity in data access across population groups, with the rural poor being the most affected (Ogbo-Gebhardt et al., 2018).

According to the National Broadband Plan, one of the targets is that the price of 1GB of data should not exceed N390, and that the minimum data speed should be 25Mbps in cities and 10Mbps in rural areas. However, the implementation struggles have hindered the realization of these targets (Agbeyangi et al., 2024).

3.6. Trust, Credibility, and Source Preferences

3.6.1. Influencers vs. Official Sources

An analysis of public tweets from January to August 2020 regarding the Lagos lockdown revealed that health information shared by the top social media influencer reached the largest audience. Akingbade (2021) studied the X interactions during the first eight months of the year 2020 and, in the course of his studies, he found out that Dr. Chinonso Egemba's @Aproko_doctor account had generated as many new followers as the Nigeria Centre for Disease Control (NCDC), however, he had significantly more interactions with the latter (the engagement was quantified through the total number of replies, retweets, and likes the account received per post).

This conclusion implies that most of the very active, engaging, and most-followed are grassroots communicators who could change society's responses to health crises. One might contend that sim-

ply by acknowledging the influencers and their modes of communicating, which the latter achieved through satire, humor, and messages based on daily life, the organizations and the government could really make a tremendous difference, as they are (Uzunoğlu & Kip, 2014).

3.6.2. Community Leaders as Trusted Sources

Leaders of the community were not only the most reliable sources of communication regarding future flood risks, but also revealed that power hierarchies did not vanish entirely and that the digital world still held a considerable space for the traditional ones. Disaster communication strategies must consider the role of the last community leader in digital communication as a new intermediary (Cvetkovic et al., 2023; Cvetković, 2023; Cvetković et al., 2025; Katz et al., 2017; Jevtić et al., 2024).

3.6.3. Trust in Early Warning Systems

Community trust and the effectiveness of warning systems will be significantly improved if ICT tools are built with input from the local population. Among the factors that can make a flood disaster even more destructive and costly are poor warning messages, no public participation in forecasting, and uncertainty about the source of information (Bonfanti et al., 2017).

3.7. Comparative Analysis: Nigeria and International Practices

3.7.1. Adoption Gap

Since 2010, the USA, Japan, Haiti, and Australia have been the countries that have benefited the most from the social media implementations in their disaster management cycle, while Africa is still very far behind; in fact, social media is seen as a minimal communication tool within the disaster management context (Manatsa et al., 2019).

3.7.2. Lessons from Other African Countries

Even though Ghana has been a witness to the growing role of social media technologies in disaster management, it still wants to be the 'contrary narration,' and the dead communication is just posting disaster information on social media, which is very rare even when it happens (Manatsa et al., 2019).

A force-field analysis of the current disaster situation in Africa shows both driving and restraining forces concerning the adoption of social media. The analysts have concluded that the stakeholders of Africa's disaster management are almost entirely equipped with the necessary tools and conditions for the application of social media technology in managing climate-related disasters; however, the institutional, capacity, and policy difficulties limit the usage of those tools and conditions (Ejem et al., 2025).

3.8. Integration of Traditional and Digital Communication Systems

3.8.1. Multi-Channel Approaches

NEMA has translated emergency messages into various local languages and is also attempting to raise awareness through the National Orientation Agency by airing jingles on local radio stations about preparedness (Eze & Akinlolu, 2025). So, radio, Facebook, and traditional media, social media, and face-to-face communication, respectively, have made it easier for community leaders to receive early warning information; hence, different media may be used in combination (Đorđević & Gačić, 2024).

3.8.2. Hybrid Communication Models

IRC has compiled local knowledge, hydrological and meteorological data, and satellite information, illustrating the effectiveness of hybrid approaches. The model considers the 128 million Nigerians who were cut off from the internet at the beginning of 2025; thus, integrating traditional communication methods becomes imperative rather than replacing them (Jevtić et al., 2024).

3.9. Summary Tables

Table 1. Digital Infrastructure Statistics in Nigeria (2025).

Indicator	Value	Percentage	Urban-Rural Divide	Source
Total Population	235 million	100%	55.4% urban / 44.6% rural	Dossa et al., 2025
Internet Users	107 million	45.4%	57% urban / 23% rural	Ogbo-Gebhardt et al., 2018; Agbeyangi et al., 2024
Offline Population	128 million	54.6%	Predominantly rural	Calculated from internet user data
Social Media Users	38.7 million	16.4%	Concentrated in urban areas	Nyambo et al., 2024
Broadband Penetration	-	48.81%	Significant urban-rural gap	Oladele, 2024; Agbeyangi et al., 2024
Data Cost Burden	-	4.2% of GNI per capita	5% urban / 20% rural of the monthly income	Ogbo-Gebhardt et al., 2018; Calabrese et al., 2024

Table Note: All data reflects 2025 figures unless otherwise specified. Urban-rural internet access figures from Ogbo-Gebhardt et al. (2018) represent the most recent available disaggregated data validated by Agbeyangi et al. (2024). GNI = Gross National Income.

Table 2. Social Media Platform Usage for Disaster Communication in Nigeria.

Platform	Market Share/Usage Pattern	Primary Function	Key Strengths	Major Limitations
Facebook	50%+ social media traffic in Africa; 34.4% preference for disaster info	Information dissemination, community engagement	Wide reach, multimedia support	Misinformation spread, algorithm filters
X	45.9% user preference for disaster info; <25% market share	Real-time updates, monitoring	Speed, hashtag organization	Limited penetration, verification challenges
WhatsApp	4.1% preference for disaster info; widespread daily use	Community-level communication	High penetration, easy use	Closed platform, misinformation spread
YouTube	Second to Facebook in traffic	Video education, documentation	Visual demonstration, accessibility	Bandwidth requirements, production costs
Instagram	8.2% preference for disaster info	Visual storytelling, youth engagement	Visual appeal, influencer reach	Limited text capacity, demographic skew

Table Note: Sources: Facebook market share and user numbers (Nyambo et al., 2024; Olaitan, 2021); X usage for disaster info (Ejem et al., 2024); WhatsApp usage patterns (Johns et al., 2023; Marsh et al., 2024); platform rankings (Ejem et al., 2025). "Market share" refers to the percentage of total social media traffic in Africa. "User preference" percentages from Ejem et al. (2024) survey represent stated preferences for disaster information. The platform was known as Twitter for most of the study period (2020-2023) and was it was rebranded as X in 2023.

Table 3. Challenges in Digital Disaster Communication in Nigeria.

Challenge Category	Specific Issues	Impact Level	Affected Populations
Infrastructure	27M without telecom access, 19,000+ fibre cuts (Jan-Aug 2025)	High	Rural communities, low-income urban areas
Affordability	Data costs 4.2% of GNI, up to 20% of rural monthly income	High	Rural populations, economically vulnerable
Digital Literacy	Limited skills to verify information	Medium-High	Elderly, rural populations, less educated
Misinformation	800+ instances (Jan-Oct 2020), 67% rely on social media	High	All populations, especially the elderly
Trust Deficit	Low trust in official sources, preference for influencers	Medium-High	Urban youth, educated populations
Geographic Coverage	Urban centers consume 75-80% of data	High	Rural communities

Table Note: Sources: Telecom access and infrastructure vandalism (Ogbo-Gebhardt et al., 2018; Oladele, 2024); affordability data (Calabrese et al., 2024; Ogbo-Gebhardt et al., 2018); misinformation statistics (Akingbade, 2021; Adeoti, 2023); social media credibility (Akoja & Nweneazizi, 2020); digital literacy and age factors (Hazzan, 2023); geographic coverage (Agbeyangi et al., 2024). Impact levels assessed based on the frequency of mention in the reviewed literature and reported consequences. Data cost burden: 4.2% represents annual GNI per capita; 20% (rural) and 5% (urban) represent monthly income share.

Table 4. Early Warning System Components and Effectiveness

Component	Technology Used	Reach (%)	Effectiveness Rating	Key Limitations
Bulk SMS	Mobile networks	68.8% access	Medium	Limited to mobile users, one-way
Radio Broadcasts	Traditional radio	High (including offline population)	High	Limited targeting, language barriers
Social Media Alerts	Facebook, X, WhatsApp	16.4% (social media users)	Medium	Digital divide, misinformation
Mobile Apps	GRMI web/mobile app	Growing	Medium-High	Smartphone requirement, awareness gap
Community Networks	Traditional leaders, town criers	High	High	Slow dissemination, coverage gaps
IoT Sensors	River/drainage monitoring	Pilot stage	High (where deployed)	Limited deployment, maintenance costs

Table Note: Sources: SMS and alert reach (Okocha et al., 2024); radio effectiveness (Eze & Akinloju, 2025; Marsh et al., 2024); social media penetration (Nyambo et al., 2024); GRMI app (Balogun et al., 2025); community networks (Marsh et al., 2024; Bonfanti et al., 2023); IoT sensors (Bandara et al., 2025). Effectiveness ratings were synthesized from multiple study assessments of reach, response rates, and user satisfaction where available. "Reach" percentages indicate the proportion of at-risk populations who received warnings through each channel during the 2022 flood events, unless otherwise specified.

Table 5. Trusted Sources for Disaster Information,

Source Type	Trust Level	Engagement Rate	Population Preference	Communication Style
Community Leaders	High	High	Rural, traditional communities	Face-to-face, local languages
Social Media Influencers	Medium-High	Very High	Urban youth, educated	Relatable, humorous, conversational
Official Government Accounts (NEMA, NCDC)	Medium	Low-Medium	General population	Formal, factual
Radio Stations	High	High	Rural, elderly, general	Broadcast, local languages
Family/Friends via WhatsApp	Medium	High	All demographics	Personal, conversational
News Websites	Medium	Medium	Educated, urban	Formal, detailed

Table Note: Sources: Community leader trust (Marsh et al., 2024; Bonfanti et al., 2023); influencer engagement (Akingbade, 2021; Uzunoğlu & Kip, 2014); official government account performance (Eze & Akinlolu, 2025; Onyekwelu, 2024); radio trust (Marsh et al., 2024); WhatsApp family/friend networks (Johns et al., 2023); news website credibility (Akoja & Nweneazizi, 2020). Trust and engagement levels were synthesized from survey data and social media analytics reported across multiple studies. “Engagement rate” refers to interaction metrics (likes, shares, comments, replies) per post; “trust level” is based on survey respondents’ stated confidence in source reliability.

Table 6. Comparative Analysis - Social Media Adoption in Disaster Management

Country/Region	Adoption Level	Key Platforms	Integration Stage	Success Factors
United States	High	X, Facebook, specialized apps	Fully mainstreamed	Infrastructure, institutional capacity, and digital literacy
Japan	High	X, LINE, specialized systems	Fully mainstreamed	Technology infrastructure, disaster preparedness culture
Australia	High	Facebook, X, emergency apps	Fully mainstreamed	Infrastructure, coordinated institutional framework
Haiti	Medium-High	X, Facebook, SMS	Integrated during crises	International support, NGO involvement
Nigeria	Low-Medium	Facebook, X, WhatsApp	Limited, not mainstreamed	Urban centers only, limited to posting information
Ghana	Low-Medium	Facebook, X	Very limited, one-way	Similar challenges to Nigeria

Table Note: Sources: US, Japan, and Australia adoption (Ginzarly et al., 2025; Acikara et al., 2023); Haiti integration (Christians, 2019); Nigeria and Ghana status (Ejem et al., 2025; Manatsa & Sakala, 2019; Young et al., 2020). Adoption levels categorized based on reported integration across disaster management cycle phases (preparedness, response, recovery, mitigation) and institutional mainstreaming as documented in literature. “Fully mainstreamed” indicates integration across all disaster phases with dedicated institutional frameworks; “integrated during crises” indicates ad-hoc activation during emergencies; “limited, not mainstreamed” indicates sporadic use without systematic protocols.

4. Discussion

4.1. The Paradox of Digital Potential and Limited Implementation

The study has pointed out the basic paradox in the area of digital disaster communication in Nigeria, where the country, though the most digitized in Africa in terms of social media and internet penetration, i.e. with 107 million users and excellent mobile infrastructure, has still not been able to

involve digital technologies in disaster management processes effectively (Ejem et al., 2025; Manatsa, & Sakala, 2019). This situation is contrary to the U.S., Japan, and Australia, which have incorporated social media in all disaster management cycles since 2010.

The paradox comes down to a number of factors. One such factor is the large percentage of 54.6% Nigerians who are not internet users, forming a considerable part of the population whose involvement cannot be overlooked in the disaster communication plan. The significant difference between the world's urban and rural populations with regard to internet access, with only 23% in the country as opposed to 57% in the city, shows that digital-only strategies will inevitably exclude the most vulnerable populations, which are often the most disaster-prone (Ogbo-Gebhardt et al., 2018).

The second factor is that the research has demonstrated that just putting up a platform is not enough for its effective usage. The social media presence of NEMA, which is recorded, still connotes very low systematic engagement and an inadequate social media presence that is far below global standards. This scenario is indicative of an institutional capacity, strategic planning, and sustained commitment as the factors determining effectiveness rather than technology itself (Eze & Akinlolu, 2025).

4.2. *The Infrastructure Imperative*

The infrastructural issues discussed—27 million Nigerians without telecom access, over 19,000 fiber optic cuts within eight months, and broadband penetration at just 48.81%—represent more than technical barriers. These structural obstacles not only maintain but can also create disparities in community vulnerability and capacity to respond to disasters (Agbeyangi et al., 2024).

The results have very significant repercussions for the built environment. Digital infrastructure should be treated by architects, urban planners, and construction professionals as a primary element in the disaster-resilient design process rather than as a minor one. A building or community without telecommunication infrastructure, backup power systems for communication equipment, and locations for community digital access centers will be systematically disadvantaged during disasters (Milošević et al. 2024).

The National Broadband Plan's failure to meet its 70% penetration target by 2025 suggests a gap between policy aspirations and the productive side of implementation. The launch of technological solutions is often delayed by the government's lack of commitment and poor cooperation between agencies, making it impossible to resolve governance issues through technical means alone (Agbeyangi et al., 2024).

4.3. *Misinformation as a Critical Disaster Risk Multiplier*

The situation of misinformation in the country has worsened with the high number of misinterpretation cases, which has been reported to be over 800 in Nigeria for the period of January to October 2020 (Adeoti, 2023), and a survey claiming that 67% of the entire population are using social media for news and 77% of these people have faith in the trustworthiness of such news (Akoja & Nweneazizi, 2020). It can therefore be said that misinformation is among the major risks for disasters in Nigeria. The distribution of fake cures through WhatsApp and Facebook during the epidemic might have made the suffering greater than the virus itself (Nwobi & Nwadiogbu, 2024).

Not only does the conclusion infer the opening of a can of worms, but it also completely changes the view that digital technology will be used as a disaster communication tool. The very channels that provide fast news transfer are also the ones that allow the rapid spread of false information, which most of the time gets the speed so high that it becomes impossible for fact-checkers to catch up with it (Akingbade, 2021). Adding to that is the fact that the oldest age group of Nigerians, who belong to the most uneducated group in terms of digital literacy, are the ones who mostly spread

misinformation, which complicates the whole generational debate over digital literacy further (Hazzan, 2023).

Besides, the triumph of an account such as @Aproko_doctor getting interaction days beyond that of the official health authorities is a clear signal that communicating style and perceived credibility are just as important as information's accuracy. Organizations and governments can surely learn from influencers who have gained the public's trust through satire, humor, and everyday-life relatable messaging rather than relying entirely on statistics that are often dry and uninviting (Uzunoğlu & Kip, 2014).

Nevertheless, the dependency on influencers could be problematic, too. The official bodies might be the ones that are mostly accountable, but in contrast, the influencers might not have the needed scientific expertise or organizational memory, and their popularity might not always match the truth of the information. The question that arises now is how to get the most out of the influencer involvement while still keeping the information at a high standard (Uzunoğlu & Kip, 2014).

4.4. Trust, Authority, and the Role of Traditional Systems

Among the various sources for future flood risk communications, the least liked one, being community leaders, is the main conclusion that stands out from the survey. Disaster communication based on the community's past and present trust factors still exists, despite the widespread use of digital platforms. Furthermore, it points to the necessity of unifying the communication areas mentioned earlier; that is, communication through digital channels will only work if it includes and does not bypass the traditional systems (Bonfanti et al., 2023).

The IRC mixing of traditional knowledge with hydrological, meteorological, and satellite data is a perfect example of how old and new systems can be fused (Khan et al., 2025). This method acknowledges that the people living in the area possess knowledge which, when combined with the technical data, will completely reveal the disaster risks, their history, and when and how to confront them (Paul et al., 2021).

For the construction sector, this suggests the need for participatory design practices involving both community leaders and traditional authorities. Buildings and facilities designed without community participation may be misaligned with local disaster response practices, weakening both traditional and modern response systems (Ebekozi et al., 2025).



4.5. The Digital Divide as Disaster Vulnerability

The digital divide can be cited as one of the critical factors responsible for disaster susceptibility, especially considering that the contrast in data costs is that much more extreme to the point that rural Nigerians who are data users pay 20% of their income, while the urban population pays less than 5% (Ogbo-Gebhardt et al., 2018). The accessibility of public services is gradually being adjusted to match technological capabilities. Nevertheless, those who are not connected to the digital networks used for warning systems are completely cut off from the vital life-saving information (Agbeyangi et al., 2024).

The significantly less tragedy of an integrated communication system can be justified morally. NEMA, aware of the situation, works accordingly and thus interprets and disseminates emergency messages in local languages via the radio, in addition to digital media (Eze & Akinlolu, 2025). The retrieval of early warning information via radio, Facebook, and community leaders, categorized into different channels, supports this multi-channel strategy (Okocha et al., 2024).

Nonetheless, the research also indicates that merely making information accessible is inadequate. The situation of 68.8% access to flood early warning in 2022, which was mainly due to the floods that had a great influence, shows that people receiving the warning do not necessarily react positively to it (Bonfanti

et al., 2023). It is influenced by several factors, including trust in information sources, perceived actionability of warnings, past experiences with false alarms, and one's ability to act on warnings.

4.6. Platform-Specific Dynamics and Strategic Implications

The examination unearths a variety of usage trends specific to each platform, strengthening the argument for a more personalized communication approach. Facebook was the most crowded social platform, with more than 50% of the participants, but it was only the second platform for real-time disaster information, with 45.9% of the respondents. Instagram was the most popular social media platform, but only 4.1% of users used it to search for disaster-related information, likely due to the platform's closed environment and the association of misinformation with it (Ejem et al., 2025).

The mentioned trends imply that disaster communication strategies must be tailored to each platform based on its strengths and weaknesses. The instant nature and hashtag-based organization of X make it suitable for situational awareness and rapid updates (Ejem et al., 2025). Facebook's large audience and support for multimedia are most appropriate for building community and sharing detailed information. WhatsApp's user-friendliness, coupled with broad penetration, makes it useful for effective communication at the community level and with the general public when appropriate fact-checking methods are established.

Hence, practitioners must use multi-platform models in their communication, coordinating and tailoring messages to the characteristics and expectations of each platform. The fact that official accounts can effectively use the platforms available to them when well-managed indicates that training disaster management professionals in social media communication is a vital investment.

4.7. Mobile Technology: Beyond Simple Alerts

The study that highlights the scenario of mobile technology reveals that it is not only SMS alerts that are being used, but also tech systems such as connected IoT sensors, GIS mapping, and mobile applications. Among the examples is GRMI's flood reporting app, which allows real-time data sharing between emergency agencies, and the IRC's prediction-based financing system, which makes anticipatory cash payments (Balogun et al., 2025).

Nonetheless, these innovations are still in a trial phase and have not reached full production. Technology's capabilities versus large-scale application draw a line that shows the limits of funding, lack of institutional capacity, complex coordination, and the divide between smartphone and feeder phone users as the main challenges that need to be eliminated.

Research findings provide a good opportunity for construction and infrastructure development to incorporate mobile-enabled sensors and monitoring systems in their designs. The eventuality of IoT-enabled sensors in drainage systems, monitoring systems for structural integrity in buildings, and smart infrastructures that can communicate with emergency management systems is a merging of built environment practices and digital disaster communication (Damaševičius et al., 2023).

4.8. Policy-Practice Gap and Implementation Challenges

When implemented jointly, the National Disaster Risk Management Policy, 2018, and the National Broadband Plan, 2020-2025, provide an all-encompassing foundation for digital disaster communication (Agbeyangi et al., 2024). The 2025-2029 strategic plan of NEMA and its partnership with the NCC indicate that the development of the institutions is on the right track. However, the persistent gap between the policy's aspirations and the actual over-broadband penetration of 48.81%, which is far from the 70% target, and the existence of 27 million people without access to telecom services—these all signal issues in governance.

Lack of robust political backing, coordination issues, infrastructure vandalism, and scarcity of funds are among the factors preventing progress. The case of 19,000 fiber cuts and 3,000 cases of equipment theft reported over an eight-month period indicates that security and infrastructure protection should be part of the digital disaster communication strategy (Oladele, 2024).

4.9. Implications for the Built Environment Sector

The research and the resultant knowledge will be the basis for architects, urban planners, engineers, and construction workers drawing some highly significant implications from the study:

1. **Infrastructure Integration:** Digital communication infrastructure will have to be a key aspect in the design of both buildings and communities, rather than being an option with a large price tag. The requirements will include, among others, mounting of telecommunication devices, backup power installations, availability of community digital access points, and creation of sensor interfacing sites.
2. **Resilient Design:** Digital infrastructure has to be included in the entire system's resilience. To start with, underground utilities must be safeguarded against vandalism, the most critical facilities should have an alternate communication system, and community areas should be designed with various communication means.
3. **Participatory Approaches:** Community leaders and traditional authorities need to be consulted throughout the process of creating buildings and infrastructures so that their reaction strategies and cultural background are acknowledged.
4. **Accessibility:** The design should consider the various degrees of digital literacy and access, and enable buildings and areas to rely on both digital and traditional communication methods in cases of emergency.
5. **Smart Building Integration:** Integration of building operations with disaster communication networks through IoT sensors, structural health monitoring, and automated alert systems is one of the channels opened up by smart building integration.

4.10. Broader Implications for Disaster Risk Reduction

This research aligns with the perspective that technology acceptance is socially, culturally, and economically rooted, thereby providing a broader view of the disaster risk reduction debate. The adequate digital disaster communication infrastructure requires not only technology deployment as the primary condition but also trust, affordability, literacy, cultural practices, and governance systems that need to be strengthened to enable its development (Bonfanti et al., 2023).

The observation that force-field analysis extracts disaster management stakeholders in Africa as being equipped with all the necessary tools and conditions for the implementation of social media technologies, but that, on the other hand, the actual usage is still minimal, points to barriers being more associated with institutional and organizational factors rather than technical ones alone. This, in turn, indicates that capacity building, institutional reform, and continuous commitment are as critical as the provision of technology (Ejem et al., 2025).

5. Conclusions

The research has clarified the role of social media and mobile phones in communication during disasters in Nigeria from 2020 to 2025. The author's first objective is to outline the five significant results step-by-step.

The first objective study's conclusion states that Nigeria has become the leader of Africa in terms of social media and internet usage through its significant penetration of these sectors, with over 107 million internet users (45.4% penetration) and over 38.7 million social media users (16.4% of the pop-

ulation) by the end of January 2025. However, social media engagement in disaster management has not yet reached the levels of the US, Japan, and Australia, which have fully adopted its use in disaster management. A huge contradiction in Nigeria's digital disaster communication ecosystem persists: being the most digitally connected country in Africa, yet unable to incorporate digital technologies into disaster management processes. The National Emergency Management Agency (NEMA) has already established a social media presence and connected with the Nigerian Communications Commission (NCC). However, engagement remains inconsistent, and disaster management officials have very low visibility on social media.

The Conclusion of the second objective study asserts that disaster communication actors in Nigeria employ a multi-platform strategy. However, distinct usage patterns across platforms are apparent. Facebook, which accounts for more than 50% of social media traffic, is at the forefront of the group that 45.9% of people turn to for real-time disaster information, and only 34.4% prefer X over Facebook for this purpose; thus, it is the dominant one. Moreover, WhatsApp accounts for just 4.1% of searches for disaster information, yet it remains the most important grassroots communication medium due to its widespread use and ease of access. The ways include: SMS alerts reaching 68.8% of the population during the 2022 floods; three-language emergency messaging through radio partnerships with the National Orientation Agency (NOA); and mobile applications like the Green Relief and Mitigation Initiative (GRMI) web/mobile app for real-time flooding reporting; and the use of IoT devices for monitoring water levels in pilot projects. However, these methods are not coordinated well, and most disaster management organizations do not go beyond merely posting information as a form of digital engagement. Instead, they limit themselves to using non-interactive communication frameworks.

The Conclusion of the Third objective study reveals an unpleasant reality concerning the usage of digital communication during disasters in Nigeria, where four interrelated problems are the most important reasons for it. First among them is poor infrastructure, which has left a whopping 128 million Nigerians (54.6%) utterly cut-off from the internet; meanwhile, only 23% of the rural populace have internet access, which is less than half of the urban areas' 57% and telecommunication companies themselves are covering only 27 million Nigerians and leaving others without any connectivity or service; additionally, in just eight months of 2025, telecoms reported more than 19,000 fiber cuts and 3,000 equipment thefts; besides, broadband penetration stood at 48.81%, a figure that is still significantly lower than the 71% target set by the National Broadband Plan. Misinformation, on the other hand, is the second most significant problem. In a way, it turns out to be the primary disaster risk driver: from January to October 2020, more than 800 instances of misinformation and fake news were recorded, at the same time, 67% of the Nigerians were dependent on social media as their primary source of information, and 77% considered the news from these platforms as accurate. Moreover, the level of digital skills remains low; the elderly in Nigeria are considered the primary sources of misinformation, and sometimes they pass on information without checking it first. The final point is that mistrust still exists. It is very tough to eliminate it: social media influencers such as @Aproko_doctor captured more public interest than official health authorities during the pandemic, while community leaders were seen as the most reliable sources of information on flood risk, thus showing that these traditional power structures have more credibility than online official sources.

The research's fourth objective demonstrates the necessity of hybrid strategies in Nigeria's disaster communication, which, on the one hand, encompasses and does not cease, and, on the other, allows the existing communicational pathways to take their place. Networking of these approaches has revealed some good examples highlighted in the study:

The model showing the integration of NEMA's various channels: The authority is converting all emergency warnings into various local languages (Hausa, Yoruba, Igbo, and others) and working with the National Orientation Agency to enable them to broadcast preparedness jingles on local radio stations (Eze & Akinlolu, 2025). This policy creates a situation where the same alert is distributed through radio (which is considered most reliable by people living in rural areas), Facebook (45.4% urban internet users), and community leaders (the most trusted source in general), thus the 128 million offline Nigerians (Marsh et al., 2024) are informed.

IRC's cash-for-work system based on weather predictions is cited as an example of operational collaboration: The scheme brings together (1) local knowledge provided by community informants regarding historical flood patterns and susceptible areas, (2) river monitoring stations providing hydrological data, (3) NIMET supplying meteorological forecasts, and (4) satellite imagery revealing rainfall patterns. Once combined thresholds are reached, the system will automatically trigger (5) mobile phone alerts to the at-risk populations via SMS, (6) notifications to the community leaders for face-to-face dissemination, and (7) cash payments through mobile money platforms, enabling pre-emptive action prior to the floods (Paul et al., 2021; Chavula et al., 2025). This method guarantees that offline users are reached via community networks, while digital users get direct mobile alerts.

The flooding report app created by GRMI serves as an excellent example of the integration model of bottom-up/top-down. Very similarly, the web app, which is mobile-friendly, can be used by the public to report floods, and thus, it will be NEMA's real-time data collection. On the other hand, NEMA will send the response information to the app, public announcements, and community networks, thus forming a closed-loop communication system (Balogun et al., 2025). The transition to a mobile app will not only improve accessibility but also ensure that non-digital users still receive information through radio and community leaders.

The aforementioned practical instances vividly and elaborately illustrate that successful integration requires: (1) delivering uniform messages through different channels, (2) localizing the content for each media (picture for social media, spoken for radio, personal for community leaders), (3) timing in stages (instant digital alerts followed by radio explanations and community leader confirmations), and (4) working together of digital agencies (NCC), disaster management (NEMA), traditional media (radio stations), and community structures. The impact of this kind of integration may differ according to the disaster— flood alerts are the most advantaged by the multi-day lead time, which permits sequential dissemination, while sudden emergencies require the simultaneous activation of all the communication channels. The definition of geographic areas is also crucial: towns can rely more on digital communication (57% internet access) while rural areas still need to use radio-and community-leader-heavy communications (only 23% internet access) (Ogbo-Gebhardt et al., 2018; Agbeyangi et al., 2024).

The conclusion reached in the research paper about the fifth aim suggests that the upgrade of Nigeria's digital disaster communication system will require several coordinated actions in five areas: (1) a robust infrastructure that can survive any kind of vandalism plus the expansion plan will include the rural areas that have been ignored so far; (2) the data will be made available at a lower cost for the country people who spend nearly 20% of their total income on it whereas the city dwellers' spending is only 5%; (3) staff will be trained for social media interactions and coordination among all platforms; (4) public education about digital devices intended for the poor especially the elderly who are the main spreaders of false news; and (5) establishing a link between the public and the government that will involve community leaders and reliable influencers while at the same time preserving the quality of information. Thus, it is essential that an integrated approach is adopted, treating digital technologies as both facilitators and barriers, hence the simultaneous attention to the technical, social, institutional, and cultural aspects of disaster communication.

Author Contributions: Tayo was a contributing factor in the formation of the research thread, participated in data interpretation, and reviewed the manuscript for intellectual content. Additionally, he was responsible for elucidating the methodology and made significant changes that enhanced the overall quality of the paper.

Daniel handled the data and the initial draft of the article, although he was involved from the start, from the concept and study design to the final writing process. In addition, he managed the entire study process and made sure that all analytical techniques were accurate and true.

Acknowledgements: The authors acknowledge the contributions of all researchers, institutions, and organizations whose work informed this study. Special recognition is extended to the National Emergency Management Agency (NEMA), Nigerian Communications Commission (NCC), and international development partners working to enhance disaster resilience in Nigeria.

Conflicts of Interest: The authors declare no conflict of interest.

6. References

1. Abbas, J., Wang, D., Su, Z., & Ziapour, A. (2021). The role of social media in the advent of COVID-19 pandemic: crisis management, mental health challenges and implications. *Risk management and healthcare policy*, 1917-1932. <https://doi.org/10.2147/RMHP.S284313>
2. Acikara, T., Xia, B., Yigitcanlar, T., & Hon, C. (2023). Contribution of social media analytics to disaster response effectiveness: A systematic review of the literature. *Sustainability*, 15(11), 8860. <https://doi.org/10.3390/su15118860>
3. Adeoti, O. M. (2023). The role of social media in creating political awareness and in the mobilization for social protests in Nigeria: A case study of the EndSARS Protest.
4. Agbeyangi, A., Makinde, A., & Odun-Ayo, I. (2024). Nigeria's ICT and Economic Sustainability in the Digital Age. <https://doi.org/10.48550/arXiv.2401.03996>
5. Akingbade, O. (2021). Social Media Use, Disbelief and (Mis) information During a Pandemic: An Examination of Young Adult Nigerians' Interactions with COVID-19 Public Health Messaging. *The African Journal of Information and Communication*, 28, 1-18. <https://doi.org/10.23962/10539/32215>
6. Akoja, M. I., & Nweneazizi, E. C. (2020). Exploring Youths Perception of Social Media as Credible News Source in Lagos, Nigeria. *Covenant journal of communication*.
7. Alimi, I. (2025). 5G Fixed Wireless Access.
8. Balogun, G. B., Olurode, M. O. ., Debo, T. O. ., & Ajiboye, R. A. . (2025). A web-based platform for disaster management. *Science World Journal*, 20(1), 45–55. <https://doi.org/10.4314/swj.v20i1.7>
9. Bandara, R. M. P. N. S., Jayasignhe, A. B., & Retscher, G. (2025). The Integration of IoT (Internet of Things) Sensors and Location-Based Services for Water Quality Monitoring: A Systematic Literature Review. *Sensors*, 25(6), 1918. <https://doi.org/10.3390/s25061918>
10. Banzal, P. (2022). Disaster Early Warning Communication Systems. In *Hydro-Meteorological Extremes and Disasters* (pp. 87-102). Singapore: Springer Nature Singapore.
11. Ben Messaoud, M. (2021). Social media and the COVID-19 pandemic: The dilemma of fake news clutter vs. social responsibility. *Journal of Arab & Muslim Media Research*, 14(1), 25-45. https://doi.org/10.1386/jammr_00023_1
12. Biswal, B. (2024). Role of information and communication technology (ICT) in disaster management: A study in India. *International Journal of Pollical Science and Governance*. <https://doi.org/10.33545/26646021.2024.v6i2a.352>
13. Bonfanti, R. C., Oberti, B., Ravazzoli, E., Rinaldi, A., Ruggieri, S., & Schimmenti, A. (2023). The role of trust in disaster risk reduction: a critical review. *International journal of environmental research and public health*, 21(1), 29. <https://doi.org/10.3390/ijerph21010029>
14. Caceres, M. M. F., Sosa, J. P., Lawrence, J. A., Sestacovschi, C., Tidd-Johnson, A., Rasool, M. H. U., & Fernandez, J. P. (2022). The impact of misinformation on the COVID-19 pandemic. *AIMS public health*, 9(2), 262. <https://doi.org/10.3934/publichealth.2022018>
15. Calabrese, L., Abudu, D., Ayele, Y., Lemma, A., & Mendez-Parra, M. (2024). Trade impacts of AfCFTA in Madagascar. London: Overseas Development Institute (ODI).
16. Chaudhary, M. T., & Piracha, A. (2021). Natural disasters—origins, impacts, management. *Encyclopedia*, 1(4), 1101-1131. <https://doi.org/10.3390/encyclopedia1040084>
17. Chavula, P., Kayusi, F., Lungu, G., & Uwimbabazi, A. (2025). The Current Landscape of Early Warning Systems and Traditional Approaches to Disaster Detection. *LatIA*, (3), 77.
18. Chen, D., Liu, Z., Wang, L., Dou, M., Chen, J., & Li, H. (2013). Natural disaster monitoring with wireless sensor networks: A case study of data-intensive applications upon low-cost scalable systems. *Mobile Networks and Applications*, 18(5), 651-663.
19. Christians, C. G. (2019). *Media ethics and global justice in the digital age*. Cambridge University Press.
20. Cubos, F. (2024). Regional: Increasing Investments in Early Warning Systems to Strengthen Climate and Disaster Resilience.
21. Cumbe, J. (2025). Transformation of Conventional Business Strategy to Digital Model: Literature Study in Africa. *Journal Dimensie Management and Public Sector*, 6(4), 1-15. <https://doi.org/10.48173/jdmpps.v6i4.350>
22. Cvetković, V. (2023). A predictive model of community disaster resilience based on social identity influences (MODERSI). *International Journal of Disaster Risk Management*, 5(2), 57–80.
23. Cvetković, V. M., Aleksova, B., Renner, R., Gačić, J., Ivanov, A., & Milašinović, S. (2025). Community-Based Disaster Risk Reduction: Overcoming Barriers to Build Stronger Communities. *International Journal of Disaster Risk Management*, 7(2), 113–130.
24. Cvetkovic, V. M., Nikolic, A., & Ivanov, A. (2023). The role of social media in the process of informing the public about disaster risks. *Journal of Liberty and International Affairs*, 9(2), 104-119.

25. Damaševičius, R., Bacanin, N., & Misra, S. (2023). From sensors to safety: Internet of Emergency Services (IoES) for emergency response and disaster management. *Journal of sensor and actuator networks*, 12(3), 41. <https://doi.org/10.3390/jsan12030041>
26. Dibi-Anoh, P. A., Koné, M., Gerdener, H., Kusche, J., & N'Da, C. K. (2023). Hydrometeorological extreme events in West Africa: droughts. *Surveys in Geophysics*, 44(1), 173-195.
27. Đorđević, I., & Gačić, J. (2024). Sustainable recovery: The link between development and response to disasters. *International Journal of Disaster Risk Management*, *6*(2). <https://doi.org/10.18485/ijdrm.2024.6.2.15>
28. Dossa, K. F., Miassi, Y. E., Bakary, S., & Ogou, F. K. (2025). Drowning in urban growth: rethinking flood resilience and spatial equity in Lagos, Nigeria. *Frontiers in Sustainable Resource Management*, 4, 1659930. <https://doi.org/10.3389/fsrma.2025.1659930>
29. Du, S., Hashim, N., & Kamarudin, S. (2023). Unraveling the social media experience: A captivating exploration of uses and gratifications theory. *International Journal of Academic Research in Business and Social Sciences*, 13(12), 850-874. <https://doi.org/10.6007/IJARBS/v13-i12/19895>
30. Ebekozi, A., Nwaole, A. N. C., Aigbavboa, C. O., Ahmed, M. A. H., Samsurijan, M. S., Thwala, W. D., & Ikuabe, M. O. (2025). Appraising young-adult internal migrants into construction craftsmanship: issues surrounding skill acquisition and competencies in Nigeria. *Engineering, Construction and Architectural Management*.
31. Ejem, A. A., Okeke, S. V., Ojeka-John, R. O., & Adekeye, E. T. (2025). Social media and climate-related disaster management in Africa: A force-field analysis. *Jambá: Journal of Disaster Risk Studies*, 17(1), 1-11. <https://doi.org/10.4102/jamba.v17i1.1753>
32. Elbanna, A., Bunker, D., Levine, L., & Sleigh, A. (2019). Emergency management in the changing world of social media: Framing the research agenda with the stakeholders through engaged scholarship. *International Journal of Information Management*, 47, 112-120. <https://doi.org/10.1016/j.ijinfomgt.2019.01.011>
33. Erokhin, D., & Komendantova, N. (2024). Social media data for disaster risk management and research. *International Journal of Disaster Risk Reduction*, 114, 104980.
34. Esposito, M., Palma, L., Belli, A., Sabbatini, L., & Pierleoni, P. (2022). Recent advances in internet of things solutions for early warning systems: A review. *Sensors*, 22(6), 2124. <https://doi.org/10.3390/s22062124>
35. Eze, E. N., & Akinlolu, S. D. (2025). NEMA'S Role in Flood Response: A Study of Communication Approaches with South-South Nigeria Residents in 2019. *Research Journal of Literature, Languages and Linguistics*, 13(2), 1-16.
36. Fevrier, K. M. (2020). Race and waste: The politics of electronic waste recycling & scrap metal recovery in Agbogboshie, Accra, Ghana.
37. Gharib, Z., Bozorgi-Amiri, A., Tavakkoli-Moghaddam, R., & Najafi, E. (2018). A cluster-based emergency vehicle routing problem in disaster with reliability. *Scientia iranica*, 25(4), 2312-2330. <https://doi.org/10.24200/sci.2017.4450>
38. Ginzarly, M., Teller, J., & Dujardin, S. (2025). Social media use in disaster response: empowering community resilience. *International Journal of Digital Earth*, 18(1), 2521791. <https://doi.org/10.1080/17538947.2025.2521791>
39. Hazzan, M. K. (2023). Deception in the era of digital technologies and the distortion of reality and facts: An X-Ray of Nigerian peculiarities. *E-Learning and Digital Media*, 20(6), 563-578. <https://doi.org/10.1177/20427530221124002>
40. Hendricks, M. D., Meyer, M. A., & Wilson, S. M. (2022). Moving up the ladder in rising waters: Community science in infrastructure and hazard mitigation planning as a pathway to community control and flood disaster resilience. *Citizen Science: Theory and Practice*, 7(1). <https://doi.org/10.5334/cstp.462>
41. Hondo, M. (2024). Introduction Towards a Theory of Disaster and Crisis Management: Transactional Theory of Persuasion, Coercion and Manipulation (TTPCM). In *The Palgrave Handbook of Language and Crisis Communication in Sub-Saharan Africa* (pp. 179-203). Cham: Springer International Publishing.
42. Jevtić, M., Cvetković, V. M., Gačić, J., & Raonić, Z. (2024). Factors of vulnerability and resilience of persons with disabilities during disasters: Challenges and strategies for inclusive risk reduction. *International Journal of Disaster Risk Management*, *7*(1), 91-114. <https://doi.org/10.18485/ijdrm.2025.7.1.6>
43. Johns, A., Matamoros-Fernández, A., & Baulch, E. (2023). WhatsApp: From a one-to-one messaging app to a global communication platform. John Wiley & Sons.
44. Katz, E., Lazarsfeld, P. F., & Roper, E. (2017). Personal influence: The part played by people in the flow of mass communications. Routledge. <https://doi.org/10.4324/9781315126234>
45. Khan, M., Akter, M. S., & Sultana, N. (2025). Development of a fog computing-based real-time flood prediction and early warning system using machine learning and remote sensing data. *Journal of Sustainable Development and Policy*, 1(01), 10-63125. <https://doi.org/10.63125/6y0qwr92>
46. Krichen, M., Abdalzaher, M. S., Elwekeil, M., & Fouda, M. M. (2024). Managing natural disasters: An

- analysis of technological advancements, opportunities, and challenges. *Internet of Things and Cyber-Physical Systems*, 4, 99-109. <https://doi.org/10.1016/j.iotcps.2023.09.002>
47. Kulundu, M. N. (2021). Fact-checking in the digital era: a multi-case study of how newsrooms address disinformation during breaking news.
 48. Kuś, A., Kuflewska, W., & Trocewicz, A. (2025). European vision of a gigabit society: Evidence from Poland. *Sustainability*, 17(3), 1271. <https://doi.org/10.3390/su17031271>
 49. Kwarteng, M. A., Ogiemudia, O. M., Ekpenyong, B. N., Amaechi, O. U., Ogbonna, G., Daniel-Nwosu, E. I., & Osuagwu, U. L. (2025). Prevalence and Severity of Anxiety, Depression, and Stress Among Optometry Students in Nigeria: A Cross-Sectional Study. *medRxiv*, 2025-10. <https://doi.org/10.1101/2025.10.23.25338666>
 50. Liu, W., Xu, C., Peng, Y., & Xu, X. (2023). Evolution of tourism risk communication: A bibliometric analysis and Meta-Analysis of the antecedents of communicating risk to tourists. *Sustainability*, 15(12), 9693. <https://doi.org/10.3390/su15129693>
 51. Liu, X. (2025). Climate Change and Sustainable Development in Africa: Challenges and How to Respond through Early Warning Systems. *Chinese Journal of Urban and Environmental Studies*, 13(01), 2550005. <https://doi.org/10.1142/S2345748125500058>
 52. Manatsa, D., & Sakala, L. (2019). Harnessing scientific knowledge and technological innovation for disaster risk reduction (DRR) in sub-Saharan Africa-Case of social media. In *Global Summit of Research Institutes for Disaster Risk Reduction* (pp. 157-168). Singapore: Springer Nature Singapore.
 53. Marsh, I., Conley, E., Coleman, A., Brataas, K., Stoneking, D., & Mocanu, R. (2024). The Media and Early Warning Systems. In *Oxford Research Encyclopedia of Natural Hazard Science*. <https://doi.org/10.1093/acrefore/9780199389407.013.490>
 54. Matar, S., Matar, N., Balachandran, W., & Hunaiti, Z. (2016). Social media platforms and its applications in natural disaster and crisis events—the case of Bosnia & Herzegovina. *Journal of Information & Knowledge Management*, 6(5), 50-56.
 55. Mgbe-Ordinma, C. G., & Aríjeníwà, A. F. (2024). Post-Crisis Communication Strategies for Reputation Recovery and Rebuilding Trust. *Communication and media dynamics*, 293.
 56. Milošević, G., Cvjetković-Ivetić, C., & Baturan, L. (2024). State aid in reconstruction of natural and other disasters' consequences using the budget funds of the Republic of Serbia. *International Journal of Disaster Risk Management*, 6*(2). <https://doi.org/10.18485/ijdrm.2024.6.2.11>
 57. Naeem, M., Ozuem, W., Howell, K., & Ranfagni, S. (2023). A step-by-step process of thematic analysis to develop a conceptual model in qualitative research. *International journal of qualitative methods*, 22, 16094069231205789. <https://doi.org/10.1177/16094069231205789>
 58. Nwaobi, G. (2024). Nigerian Firms and Digital Transformation: Incubations, Unipoding and Prospects.
 59. Nwobi, F., & Nwadiogbu, N. (2024). Social Media and Issues in Covid-19 Pandemic: Nigeria in Dilemma. *Journal of Policy and Development Studies*, 17(1), 245-258. <https://doi.org/10.4314/jpds.v17i1.19>
 60. Nyambo, B. M., Marufu, H., Mutare, C. T., Dzinavatonga, K., & Mbiza, S. (2024). Internet Penetration and Social Media Usage in the SADC Region:* Note: Sub-Titles are not Captured in Xplore and Should not be Used. In *2024 3rd Zimbabwe Conference of Information and Communication Technologies (ZCICT)* (pp. 1-9). IEEE.
 61. Ogar, M. B. (2023). Sacred Forests and Rivers: The Role of Indigenous Religion in Promoting Environmental Sustainability in Abanyom, Cross River State, Nigeria. University of Johannesburg (South Africa).
 62. Ogbo-Gebhardt, E., Brown, T., & Sicker, D. (2018). Is Broadband Speed a Barrier to Internet Use in Rural Communities? An Assessment of Mobile Infrastructure and Internet Use Habits in Urban and Rural Nigeria. *An Assessment of Mobile Infrastructure and Internet Use Habits in Urban and Rural Nigeria* (March 16, 2018). TPRC, 46.
 63. Ogunleye, O. I., & Arohunsoro, S. J. (2024). An assessment of the socio-economic impacts of rainstorm disaster disasters on the livelihood of the residents of Ikole Local Government Area in Ekiti State, Nigeria. *International Journal of Disaster Risk Management*, 6*(2). <https://doi.org/10.18485/ijdrm.2024.6.2.14>
 64. Ojha, J. C., Bhattarai, P. C., & Devkota, B. (2024). Teachers' perception towards responses of COVID-19 pandemic management in Gandaki Province of Nepal: A cross-sectional survey. *International Journal of Disaster Risk Management*, 7*(1). <https://doi.org/10.18485/ijdrm.2025.7.1.27>
 65. Okaka, W., & Nagasha, I. J. (2016). Social Marketing Communication Strategy for Sustainable Tourism. In *Conference: Cork Institute of Technology Business School* (pp. 1-11).
 66. Okocha, D. O., Faloseyi, M., & Obiorah, A. C. (2024). Risk communication for disaster prevention and management in the rural communities of Mangu local government in Plateau state, Nigeria. *Otoritas: Jurnal Ilmu Pemerintahan*, 14(3), 730-750.
 67. Okunola, O. H. (2025). Exploring multi-level governance arrangements in disaster recovery: A study of Lagos, Nigeria. *International Journal of Disaster Risk Reduction*, 118, 105254.
 68. Oladele, O. K. (2024). Telecommunications and Disaster Management: Role in Emergency Response.

69. Olaitan, O. (2021). The impact of social media (Twitter, Facebook and Instagram) on consumer behaviour in Nigeria (Doctoral dissertation, Dublin Business School).
70. Onyekwelu, R. U. (2024). National Emergency Management Agency and Disaster Management: An Assessment of Flood Disaster Management in Anambra North Senatorial Zone of Anambra State, Nigeria.
71. Pantiris, P., Pallis, P. L., Chountalas, P. T., & Dasaklis, T. K. (2025). Enhancing Coordination and Decision Making in Humanitarian Logistics Through Artificial Intelligence: A Grounded Theory Approach. *Logistics*, 9(3), 113. <https://doi.org/10.3390/logistics9030113>
72. Paul, J. D., Bee, E., & Budimir, M. (2021). Mobile phone technologies for disaster risk reduction. *Climate Risk Management*, 32, 100296. <https://doi.org/10.1016/j.crm.2021.100296>
73. Rezvani, S., Falcão, M. J., Komljenovic, D., & de Almeida, N. M. (2023). A systematic literature review on urban resilience enabled with asset and disaster risk management approaches and GIS-based decision support tools. *Applied Sciences*, 13(4), 2223. <https://doi.org/10.3390/app13042223>
74. Salmi, J., Amegah, A., & Shinde, A. R. (2025). Digital Skills, Innovation, and Economic Transformation: Opportunities and Challenges for Sub-Saharan Africa. *Education Working Papers*,(203093). Available at: <https://openknowledge.worldbank.org/server/api/core/bitstreams/36f246ee-42ef-46c4-a812-4a8c26d96709/content>.
75. Sugavanam, S. C., & Natarajan, B. (2020). Pseudoscientific beliefs and practices in the COVID-19 pandemic: A narrative review of unwanted experiments attributed to social media-based misinformation afflicting the public health. *Journal of Health & Biological Sciences*, 8(1), 1-9. <https://doi.org/10.12662/2317-3076jhbs.v8i1.3394.p1-9.2020>
76. Tarricone, P., Mestan, K., & Teo, I. (2021). Building resilient education systems: A rapid review of the education in emergencies literature. <https://doi.org/10.37517/978-1-74286-639-0>
77. United Nations Office for Disaster Risk Reduction. (2025). *Global Assessment Report on Disaster Risk Reduction 2025: Resilience Pays: Financing and Investing for our Future*. Stylus Publishing, LLC.
78. Uzunoğlu, E., & Kip, S. M. (2014). Brand communication through digital influencers: Leveraging blogger engagement. *International journal of information management*, 34(5), 592-602. <https://doi.org/10.1016/j.ijinfomgt.2014.04.007>
79. Young, C. E., Young, C. E., Kuligowski, E. D., & Pradhan, A. (2020). A review of social media use during disaster response and recovery phases (pp. 01-31). Gaithersburg, Maryland: US Department of Commerce, National Institute of Standards and Technology. <https://doi.org/10.6028/NIST.TN.2086>
80. Zhang, H., & Chen, W. (2022). Social media support mechanisms for organizational adaptation in governmental response to extreme natural hazards. *Natural Hazards Review*, 23(2), 05022002. [https://doi.org/10.1061/\(ASCE\)NH.1527-6996.0000055](https://doi.org/10.1061/(ASCE)NH.1527-6996.0000055).



