

Telecom's Role in Disaster Response and Resilience

Leveraging Connectivity for Crisis Management



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Introduction

Disasters are events that cause significant disruption, damage, or loss of life to a community or a region. They can be natural, such as earthquakes, floods, cyclones, or volcanic eruptions, or human-caused, such as wars, terrorist attacks, industrial accidents, or cyberattacks. Disasters pose serious challenges to the social, economic, and environmental well-being of the affected areas, and require coordinated and effective response and recovery efforts from various stakeholders, including governments, civil society, and private sector.



One of the key sectors that is crucial for disaster management is telecommunication. Telecommunication refers to the transmission and exchange of information and data through various technologies, such as radio, telephone, internet, satellite, or wireless networks. Telecommunication enables communication, coordination, and collaboration among disaster responders, authorities, and affected communities, as well as the provision of timely and accurate information, early warning, and emergency services. Telecommunication also supports the restoration of normalcy and the continuity of essential services, such as health, education, banking, and commerce, in the post-disaster phase.

However, telecommunication services are often vulnerable to the impacts of disasters, as they depend on physical infrastructure, power supply, and network availability, which can be damaged or disrupted by natural or human-caused hazards.

For example during Cyclone Tauktae that struck India's western coastal areas in May 2021, many telecom towers, cables, and generators were destroyed or affected by intense winds and heavy rains, resulting in network outages and reduced connectivity in several districts. Similarly, during the 2011 earthquake and tsunami that hit Japan, more than 29,000 base stations were damaged or lost power, affecting the mobile communication of millions of people.

The lack of telecommunication services can exponentially increase the impact of disasters, as it hampers the situational awareness, decision making, and operational efficiency of the disaster management agencies, and creates confusion, panic, and misinformation among the public. It also impedes access to vital resources, such as food, water, shelter, medicine, or financial assistance, and the delivery of humanitarian aid and relief materials. Moreover, it isolates the affected communities from their families, friends, and support networks, and affects their psychological and emotional well-being.

This whitepaper explores how telecoms can enhance their role in disaster management and recovery, and how they can support preparedness, mitigation, and response efforts.

Recent Disaster and Telecom Response

Let us examine some recent disasters and how telecoms responded to them. We will also understand the impact of disasters on telecommunication and how telecoms can improve their response strategies. Lastly, we will also try to understand how telecom benefited from the humanitarian efforts it provided during the crisis.

Case Study 1



The disaster

On 6 February 2023, two powerful earthquakes hit southeastern Turkey and parts of Syria, killing over 59,000 people, and injuring more than 121,000. The quakes, measuring 7.8 and 7.7 in magnitude, were among the strongest ever recorded in the region. They caused widespread damage and disruption to buildings, infrastructure, and services. They also triggered landslides, tsunamis, fires, and power outages, making the rescue and relief operations difficult.

The quakes affected an area as large as Germany and about 14 million people (about twice the population of Arizona), or 16 percent of Türkiye's population. About 1.5 million people lost their homes and needed urgent humanitarian assistance, such as food, water, shelter, health care, sanitation, protection, and psychosocial support. They also needed access to education, livelihoods, and basic services. The relief and recovery efforts faced many challenges, such as the chilly weather, the COVID-19 pandemic, the security and political instability, the lack of resources and coordination, and the risk of further aftershocks. The international community responded by sending aid, personnel, equipment, and pledging financial support. However, the disaster required more long-term and comprehensive assistance from all stakeholders.

The telecom's response

A major telecom provider launched a chatbot that asked for donations to help the people affected by the quakes. The chatbot was integrated with their website and mobile app and allowed users to donate any amount of money through various payment methods. The chatbot also provided information about the quakes, the relief efforts, and the impact of the donations. The chatbot was launched within a week of the quakes, and was available in multiple languages, such as Turkish, Arabic, English, and Kurdish.

The telecom partnered with several local and international NGOs and charities to distribute the funds to the neediest areas and people. Some of the partners were the Turkish Red Crescent, the UNHCR, the World Food Programme, the World Health Organization, and the International Federation of Red Cross and Red Crescent Societies. Telecom also waived the fees and charges for the donations made through the chatbot, and matched the donations made by its employees. The telecom also provided free calls

and SMS (Short Message Service - Text communication service component of phone, web, or mobile communication systems, using standardized communications protocols that allow the exchange of short text messages between fixed line or mobile phone devices.) to the affected regions and deployed mobile base stations and generators to restore the network coverage and connectivity. The telecom also supported the media and public awareness campaigns to promote the chatbot and the donation drive.

The impact

The chatbot had a positive impact on both the telecom and the society. For society, the chatbot provided an easy and safe way for people to donate and help the quake victims. The chatbot also increased awareness and empathy among the donors and the public. The chatbot also supported the relief and recovery efforts in the affected regions and saved lives and reduced suffering. The chatbot raised more than \$100 million in donations from more than 10 million users in the first month. The donations helped more than 2 million people in the affected regions with food, water, shelter, health care, sanitation, protection, and psychosocial support. The donations also rebuilt and repaired more than 50,000 houses, schools, hospitals, and other facilities in the affected regions. The donations also restored and enhanced the education, livelihoods, and basic services for the affected people.

For the telecom, the chatbot boosted its brand, loyalty, and responsibility. The chatbot also increased its website and app traffic and engagement, which improved its revenue and retention. The chatbot also improved its reputation and relationship with the government, the regulators, the partners, and the stakeholders. The chatbot also showed its innovation and leadership in the telecom sector and the digital economy.

Recommendations

- ✓ Telecom should assess the chatbot and the donation and relief efforts regularly and share the outcomes and opinions with the donors and the public.
- ✓ The telecom should improve the chatbot and the donation and relief efforts accordingly and adjust them to the varying needs and situations of the affected people and regions.
- ✓ The telecom should extend the chatbot and the donation and relief efforts and use them for other disasters and humanitarian crises in the future.

Case Study 2



The disaster

The Japan earthquake was a triple disaster that involved an earthquake, a tsunami, and a nuclear crisis simultaneously. It was the largest and strongest earthquake in Japan's history and in the world, with a magnitude of 9.0. It happened on March 11, 2011, near Japan's northeast coast. It triggered massive tsunamis and a nuclear meltdown at Fukushima, causing widespread damage and radiation. The disaster impacted an area as big as Germany and 20 million people. It killed 15,894, injured 6,242, and left 2,553 missing.

The telecom's response

The telecom's response was to fix and keep up the communication services that were ruined or cut off by the disaster. The telecom sector overcame many challenges, such as the lack of power, the breakdown of network equipment, the overload of traffic, the scarcity of staff, and the organization of relief efforts. The telecom sector also helped the public, the government, and the media with information, assistance, and support. Some of the key actions taken by the telecom sector were:

- ✓ Restoring the international, domestic, and mobile communication services by fixing the damaged undersea cables, base stations, switches, and generators.
- ✓ Sending mobile base stations, satellite phones, and emergency communication vehicles to the affected areas to bring back the network coverage and connectivity.
- ✓ Offering free calls, SMS, and Wi-Fi to the affected regions, and setting up public phones and charging stations at evacuation centers and shelters.
- ✓ Creating a disaster message board service and a person finder service that enabled people to leave and check messages online or by phone, and to find their missing relatives and friends.
- ✓ Backing the media and public awareness campaigns to spread the latest news, warnings, and advisories about the disaster and the relief efforts.
- ✓ Working with the government, the regulators, the partners, and the stakeholders to exchange information, resources, and expertise, and to plan the recovery and reconstruction.

The impact

The telecom's response had different effects on different communication services. Fixed line and mobile voice calls suffered from high demand and low supply, leading to limits and delays. SMS, e-mail, and social media worked better and faster than voice calls, enabling people to stay in touch and informed. The recovery speed and quality also differed by region.

Recommendations

To prepare and perform better in future disasters, the telecom sector should:

- ✓ Make the communication network more resilient and diverse, using different cables, power sources, and backup systems, to avoid or reduce service outages and damage from disasters.
- ✓ Use more mobile and satellite devices and vehicles, especially in isolated and hard-to-access areas, to keep the network coverage and connection in the affected regions.
- ✓ Focus on the vital and urgent communication services, such as voice calls, SMS, and Wi-Fi, over the less important and less urgent services, such as video streaming, gaming, and social media, to ease the network traffic and enhance the service quality and availability.
- ✓ Have a detailed disaster management plan, which covers the telecom staff's duties, the cooperation with the relevant authorities and agencies, the distribution and movement of the resources and equipment, and the backup and recovery actions.
- ✓ Teach and tell the public and the media how to use the communication services better and smarter during and after disasters, such as texting instead of calling, limiting the call time and number, and checking the disaster message board and person finder services.

Case Study 3



The disaster

The Haiti earthquake was a devastating event that hit a poor country. It destroyed electricity, water, transportation, and communication systems. Many Haitian and international officials died, making coordination hard. The relief response relied on data and internet tools, such as social media, SMS, and web maps. OpenStreetMap and Google Earth updated their maps with disaster information.

The earthquake was 7.0 in magnitude and struck near Léogâne, 25 km from Port-au-Prince, on January 12, 2010. It affected an estimated three million people, killed between 217,000 and 230,000, injured more than 300,000, and made over one million homeless. The earthquake also damaged or destroyed 300,000 houses and 30,000 commercial buildings. The earthquake was caused by a slip along a hidden fault under the town of Léogâne, about 25 km west of the capital Port-au-Prince. The earthquake had a magnitude of 7.0 and occurred at a shallow depth of 13 km. The earthquake triggered a series of aftershocks, landslides, and tsunamis, and worsened the already poor living conditions of the Haitian population. The earthquake also sparked a humanitarian crisis, as many people lacked access to food, water, medical care, and shelter. The international community responded with aid and assistance, but the recovery and reconstruction process were slow and challenging.

The telecom's response

Telecom's response to the Haiti earthquake was multifaceted and involved restoring and improving the communication infrastructure and services, providing technical and logistical support to the humanitarian agencies, and participating in the long-term reconstruction and development of the ICT (Information Communication Technology) sector. Below were some of the main aspects of response:

- ✔ Telecom activated its emergency response plan and deployed its technical teams and equipment to assess the damage and restore the network functionality. It also provided satellite phones and internet connections to the humanitarian agencies and the airport-based coordination center.
- ✔ Telecom worked around the clock to repair and replace the damaged cell towers, cables, and generators, and to expand the network coverage and capacity in the affected areas.
- ✔ Telecom collaborated with the local authorities, the ITU (International Telecommunications Union - A group of representatives from 161 countries headquartered in Geneva. The ITU publishes recommendations that influence telecom engineers), and other partners to restore and improve the communication infrastructure and services in Haiti.

Recent Disaster and Telecom Response

- ✔ Telecom participated in the comprehensive assessment of the ICT infrastructure and needs, led by the ITU, and contributed to the design and implementation of the national ICT strategy and plan.
- ✔ Telecom thanked its customers, employees, and partners for their patience, support, and solidarity during this challenging time. It also invited them to join in donating to the reputable humanitarian organizations that were providing life-saving assistance to the Haitian people.

The impact

Telecom had a positive and significant impact on the Haiti earthquake, as it:

- ✔ Improved communication and information sharing among humanitarian and government actors, despite the lack of stable terrestrial networks.
- ✔ Enabled the affected people to reach out to their loved ones and access essential information and services, such as health, education, and protection.
- ✔ Supported the long-term recovery and development of the ICT sector in Haiti, by assessing the ICT infrastructure and needs, and by collaborating on the national ICT strategy and plan.

Recommendations

The telecom sector should improve its disaster readiness and performance by:

- ✔ Protecting its communication network from cyberattacks and data breaches with encryption, authentication, and backup systems.
- ✔ Providing communication services for the poor and vulnerable at low or subsidized costs and expanding network coverage and capacity in rural and remote areas.
- ✔ Enhancing communication services with user-friendly, multilingual, and voice-enabled interfaces, to suit the user needs and preferences.
- ✔ Developing a disaster communication strategy with clear needs, objectives, channels, tools, and monitoring and feedback mechanisms.
- ✔ Educating and training the telecom staff and the users on how to use the communication services effectively and responsibly during and after disasters.

Recent Disaster and Telecom Response

The case-studies show how a lack of strategy can delay relief efforts by government and non-government agencies. Telecoms are crucial for disaster relief and restoration, as they:

- ✔ Provide communication and information services for the affected people, the humanitarian actors, and the government authorities.
- ✔ Support information sharing, coordination, and decision-making during all disaster phases, from prevention and preparedness to response and recovery.
- ✔ Help prevent and mitigate disasters by offering early warning and alert systems, risk assessment and mapping tools, and public awareness and education campaigns.
- ✔ Help respond to disasters by facilitating humanitarian aid and assistance, and by restoring social and economic functions. They use mobile phones, internet, radio, CoW, drones, balloons, or satellites to communicate, coordinate, access, and share information, and to provide network coverage and connectivity.
- ✔ Help recover from disasters by supporting reconstruction and development, and by enhancing resilience and sustainability. They use mobile money, e-commerce, e-government, cloud computing, IoT, and AI to facilitate transactions, supply chains, and public services, and to improve telecommunication and information systems.

Measuring impact of Telco in disaster preparedness

Now let us look at two super-cyclones which impacted Indian coastline in 1999 and 2013.

The 1999 Odisha cyclone was the strongest and deadliest tropical cyclone in the North Indian Ocean. It formed on October 25, 1999, in the Andaman Sea and hit Odisha on October 29, with winds of 260 km/h (160 mph) and a pressure of 912 hPa. The cyclone caused massive destruction along the coast, with a 5–6 m (16–20 ft) storm surge that flooded up to 35 km (20 mi) inland. It also brought heavy rain that caused floods and landslides. The official death toll was 9,887, but some estimates say up to 30,000. The cyclone damaged or destroyed 1.6 million homes, 20,005 flood embankments, and many crops.

The 2013 Cyclone Phailin was the second strongest tropical cyclone to hit India after the 1999 Odisha cyclone. It started on October 4, 2013, in the Gulf of Thailand and became a very severe cyclonic storm on October 10, with winds of 260 km/h (160 mph) and a pressure of 918 hPa. It landed near Gopalpur, Odisha, on October 12, 2013, at 9 pm. The cyclone brought intense winds, heavy rain, and a 3–4 m (10–13 ft) storm surge along the coast. The cyclone damaged infrastructure, agriculture, and fisheries, but the death toll was much lower than the 1999 cyclone, at only 59. This was due to better forecasting, warning, and evacuation by the government and other agencies.

The 1999 and 2013 cyclones that hit the eastern coast of India were both devastating events that caused widespread damage and loss of life. However, there were also some notable differences in the way the authorities and the public responded to these disasters, as well as the lessons learned from them.

- ✔ One of the main differences was the level of preparedness and early warning systems in place. The 1999 cyclone was a surprise for many people, as the India Meteorological Department (IMD) did not issue clear and specific warnings to the affected areas until it was too late. The IMD also faced challenges in forecasting the track and intensity of the storm, which led to confusion and uncertainty among the public. The 2013 cyclone, on the other hand, was well anticipated and tracked by the IMD, which issued timely and accurate warnings to the coastal districts. The IMD also collaborated with other agencies and media outlets to disseminate the warnings through various channels, such as radio, television, mobile phones, and public address systems. The 2013 cyclone also benefited from the creation of the Indian Disaster Resource Network (IDRN), which updated and mobilized resources for the disaster response.
- ✔ Another difference was the level of coordination and communication among the different stakeholders involved in disaster management. The 1999 cyclone exposed the lack of coordination and communication between the central and state governments and between the different departments and agencies. The 2013 cyclone, however, showed a significant improvement in the coordination and communication mechanisms, as the State Emergency Operation Centre (EOC) was fully functional and equipped with all the necessary communication devices. The EOC coordinated with the district EOCs and other departmental control rooms, as well as with the National Disaster Management Authority (NDMA) and the National Disaster Response Force (NDRF). The EOC also provided a toll-free number and an additional telephone number for the public to get updates and report incidents.

- ✔ A third difference was the level of awareness and participation of the local communities in disaster preparedness and response. The 1999 cyclone revealed the lack of awareness and participation of the masses, who did not receive or heed the warnings from the IMD. The high-tech IMD only benefited the big companies and institutions, such as the Paradeep Port, which had their own disaster management structures. The 2013 cyclone, however, demonstrated the increased awareness and participation of the local communities, who received and followed the warnings from the IMD and the media. The media played a vital role in spreading the message among the rural and urban people, and some villagers even claimed that they were getting updates from their near and dear ones over mobile phones. The local communities also cooperated with the authorities in evacuating to safer places and shelters, which reduced the casualties and injuries.
- ✔ Another major difference was the availability of operational communication equipment. All the 14 cyclone-prone districts were provided with satellite phones for ensuring communication in case of failure of telephone/cell phone. BSNL (Bharat Sanchar Nigam Limited) authorities made necessary arrangements to ensure operation of the telephone/ cell phone with backup power system and pre-positioned adequate fuel for operation of generators at telephone exchange/ cell towers. During 1999 cyclone, Bhubaneswar, the state capital, which was 150 kms away from the center of the storm, was not able to restore power to all part of the city even 11 days after the calamity. Comparatively, during the 2013 cyclone, the telecom networks were fully operational even during the cyclones and power was restored to the city completely within 48 hours.

In conclusion, telecoms are essential for disaster relief because they enable and empower disaster management and risk reduction and contribute to humanitarian and development goals. They use existing and emerging technologies and innovations to provide better and faster communication and information services, and to address disaster challenges and opportunities.

Dual challenge of telecom - BAU & Govt mandate activity

During disasters, telecoms must balance two tasks: running their normal business and supporting the government's disaster response. These tasks may clash or compete for resources, creating challenges and trade-offs for the telecom operators. This writeup will examine this dual challenge and how telecoms can manage it.

BAU Activities

BAU activities are the normal operations and functions of the telecom business, such as providing services, maintaining, and upgrading the network, ensuring profitability, complying with regulations, and managing resources. These activities are vital for the telecom sector's survival and competitiveness, and for satisfying the stakeholders. Disasters can disrupt or compromise these activities, because of infrastructure damage, power outage, network overload, revenue loss, cost increase, staff shortage, security threat, and customer grievance. These challenges can harm the telecom operators' performance and reputation and may need immediate and long-term actions to fix and enhance their BAU activities. Some of the actions that telecoms can take to keep their BAU activities during disaster are:

- ✓ Implementing a BCP that identifies the critical functions, the risks, the mitigation strategies, the contingency plans, and the recovery steps for the telecom business.
- ✓ Establishing a CMT (Configuration Management Team) that coordinates and monitors the response and recovery efforts, communicates with the stakeholders, and reports to the management.
- ✓ Deploying backup power sources, such as generators, batteries, or solar panels, to keep the network facilities running.
- ✓ Using alternative or redundant network technologies, such as satellite, wireless, or fiber optic, to provide backup or extra connectivity and coverage.
- ✓ Offering incentives or discounts to the customers, such as free calls, SMS, or data, to maintain their loyalty and satisfaction, and to make up for any service disruption or decline.
- ✓ Seeking financial support or relief from the government, the regulators, the insurers, or the donors, to pay for the losses or expenses caused by the disaster.

Government Mandated Activities

Government mandated activities are the duties of telecom operators to help the government and humanitarian agencies in disaster management. They include providing emergency communication, delivering aid, and rebuilding the affected areas. These activities are important for the public good and the telecom sector's norms.

However, disasters may create extra or conflicting demands for telecom operators, such as sharing network resources, prioritizing emergency traffic, waiving fees, disclosing customer data, collaborating with others, and following disaster rules. These demands may impact the telecom operators' interests and rights and may need them to balance their government mandated activities with their regular business activities.

Some ways telecoms can join the government mandated activities in disasters are:

- ✓ Creating a national emergency telecommunications plan (NETP) that outlines the roles, responsibilities, and steps of the telecom operators and the government in disaster management, and that sets up the coordination and cooperation methods among them.
- ✓ Being part of a telecoms emergency response team (TERT) that sends telecom experts and equipment to the disaster areas, and that gives technical and logistical help to the emergency services and organizations.
- ✓ Offering emergency telecom services, such as public call offices, mobile charging stations, or Wi-Fi hotspots, to the affected people and the relief workers, and to let them access and share crucial information.
- ✓ Helping with the disaster information management, such as giving the call detail records, the location data, or the network status, to the government and the humanitarian agencies, and to support the situational awareness, the needs assessment, and the resource allocation.
- ✓ Joining the disaster recovery and reconstruction, such as fixing or replacing the damaged infrastructure, increasing, or improving the network capacity, and supporting the resumption of the essential services and the economic activities.
- ✓ Following the disaster regulations and standards, such as the priority access schemes, the spectrum allocation rules, the interoperability guidelines, or the data protection laws, to ensure the quality, security, and legality of the telecom services.

What constitutes an efficient strategy?



A telecom strategy is vital for emergencies like disasters, pandemics, or infrastructure failures. It helps communities by:

- ✓ Ensuring communication: A stable telecom network allows emergency responders, authorities, and affected people to communicate without interruption.
- ✓ Speeding up recovery: A fast telecom service restoration helps affected areas return to normal sooner.
- ✓ Allocating resources: Telecom strategies prioritize the most urgent communication needs and use resources efficiently.

It is essential to have effective and efficient communication systems that can facilitate timely and accurate information exchange among various stakeholders, such as government agencies, relief organizations, media, and affected communities. Telecommunication is a vital tool for disaster management, as it enables the following functions:

Early warning

Telecommunication can provide advance notice of potential hazards, such as floods, cyclones, earthquakes, landslides, etc., through various channels, such as radio, television, internet, mobile phones, sirens, etc. Early warning can help people to prepare, evacuate, or take other appropriate actions to reduce the risk of harm.

Coordination

Telecommunication can support the coordination of disaster response and recovery efforts, by enabling the communication and collaboration among different actors, such as national and local authorities, emergency services, humanitarian agencies, volunteers, etc.

Telecommunication can also help to monitor and assess the situation, identify the needs and gaps, allocate and mobilize resources, and track and evaluate the progress and impact of the interventions.

Information dissemination

Telecommunication can support the coordination of disaster response and recovery efforts, by enabling the communication and collaboration among different actors, such as national and local authorities, emergency services, humanitarian agencies, volunteers, etc.

Telecommunication can also help to monitor and assess the situation, identify the needs and gaps, allocate and mobilize resources, and track and evaluate the progress and impact of the interventions.

Restoration

Telecommunication can facilitate the restoration of normalcy and functionality in the disaster affected areas, by enabling the re-establishment of essential services, such as electricity, water, health, education, etc. Telecommunication can also support the recovery and reconstruction of the physical and social infrastructure, such as roads, bridges, buildings, networks, etc.

Telecommunication can also help to restore the social and psychological well-being of the affected people, by enabling them to reconnect with their families, friends, and communities. The telecom sector can adopt various technological, organizational, and policy measures to overcome challenges, such as repairing and replacing the damaged equipment, deploying mobile and satellite solutions, providing free and priority services, establishing disaster message boards and person finder services, supporting media and public awareness campaigns, collaborating with government, regulators, partners, and stakeholders, and following international standards and guidelines

The telecom sector can also leverage its innovation and leadership potential to create and implement new and improved solutions for disaster management, such as using internet and social media applications, SMS and text messages, web-based maps and platforms, and artificial intelligence and data analytics

Building resilient telecom system

It is imperative for telecom organizations to have a strategy to deal with disasters and to ensure the resilience and reliability of their services in times of crisis. A strategy is a plan of action that outlines the goals, objectives, and activities of an organization to achieve a desired outcome. A disaster strategy for telecom organizations should address the following aspects:

Risk assessment

This involves identifying and analyzing the potential hazards, vulnerabilities, and impacts that can affect the telecommunication services, and prioritizing the areas and assets that need protection and mitigation measures.

Preparedness

This involves developing and implementing policies, procedures, and standards to enhance the readiness and capacity of the telecom staff, infrastructure, and network to cope with and respond to disasters, such as emergency plans, backup systems, contingency arrangements, training, and drills.

Response

This involves activating and executing the emergency plans and procedures to restore and maintain the telecommunication services during and immediately after a disaster, such as deploying mobile units, repairing damaged equipment, rerouting traffic, and coordinating with other agencies and stakeholders.

Recovery

This involves restoring and improving the telecommunication services to their pre-disaster or better conditions, and incorporating the lessons learned and best practices from the disaster experience, such as upgrading the infrastructure, technology, and network, and revising the policies, procedures, and standards.

A disaster strategy for telecom organizations should be based on the principles of disaster risk reduction, which aim to prevent or reduce the adverse effects of disasters and to build the resilience of the communities and systems. Some of the key principles are:

Participation

This involves engaging and involving the relevant stakeholders, such as telecom staff, customers, partners, regulators, and authorities, in the development, implementation, and evaluation of the disaster strategy, and ensuring their feedback, inputs, and views are considered and incorporated.

Coordination

This involves establishing and maintaining effective communication and collaboration among the telecom organization and other actors involved in disaster management, such as government agencies, civil society organizations, private sector entities, and international organizations, and ensuring their roles, responsibilities, and expectations are clear and aligned.

Innovation

This involves adopting and applying new and emerging technologies, methods, and solutions to enhance the performance, efficiency, and quality of the telecommunication services, and to address the challenges and opportunities posed by disasters, such as artificial intelligence, cloud computing, blockchain, or drones.

Sustainability

This involves ensuring the disaster strategy is consistent and compatible with the environmental, social, and economic goals and values of the telecom organization and the society, and that it contributes to the long-term development and well-being of the affected areas and communities.

Generic guidelines for telecoms for disaster preparedness and relief

1. Use of Chatbots
 - a. Develop a conversational flow for chatbots, ready to be activated during crisis situations.
 - b. Define a process for collecting and routing donations to appropriate relief agencies.
 - c. Leverage chatbots for providing essential information and culling the rumors surrounding disaster.
2. Logistics support
 - a. Keep logistics on standby for anticipated disasters.
 - b. Make temporary telecom equipment available in zonal telecom locations.
3. Communication guidelines
 - a. Encourage text-based communication and limit non-essential usage during emergencies.
 - b. Utilize Wi-Fi networks and deploy temporary networks for non-functional scenarios.
 - c. Use alternative communication methods like satellite communication and mesh networks when infrastructure is damaged.
4. Information Dissemination
 - a. Establish links between disaster coordinators, telecommunication authorities, and service providers.
 - b. Use multiple channels for information dissemination, including cell broadcasts, SMS messaging, radio, television, internet, social media, satellite phones, and ham radios.
 - c. Leverage mobile communication solutions and Internet of Things (IoT) technology for early warning systems, data-driven decision making, and infrastructure monitoring.
5. Artificial Intelligence (AI) and Big Data Analytics in Disaster Management
 - a. Use AI and big data analytics for prediction and prevention, optimization, and automation, and learning and improvement in disaster management.
6. Accessibility and affordability
 - a. Address issues of accessibility and affordability, security and privacy, regulation, and coordination.
 - b. Foster innovation and collaboration among various sectors and disciplines.
7. Creation of Integrated Database- Security & governance?
 - a. Create an integrated database for disaster management and recovery, containing information about communication resources, GIS (Geographical Information System.) data, network status, disaster history and response, staff duties and training, and supporting agencies/industries/individuals.

8. MOU (Memorandum of Understanding) with other Agencies
 - a. Make MOUs (Memorandum of Understanding) mandatory among various relief agencies for disaster management, ensuring cooperation and coordination among the agencies.
 - b. MOUs should cover aspects like emergency communication, sharing of facilities and infrastructure, and airlifting and helicopter service of telecom equipment.
9. Training and Education:
 - a. Regularly train staff on disaster management protocols and procedures.
 - b. Educate customers on best practices during disasters, such as conserving battery life, using text-based communication, and connecting to Wi-Fi networks.
10. Collaboration with Government and NGOs
 - a. Collaborate with government agencies and NGOs for effective disaster management.
 - b. Participate in government-led disaster drills and simulations to test and improve disaster response.
11. Infrastructure Resilience
 - a. Invest in building resilient infrastructure that can withstand disasters.
 - b. Regularly inspect and maintain infrastructure to ensure it is in good condition and ready for use during disasters.
12. Post-Disaster Recovery
 - a. Have a recovery plan in place to restore services as quickly as possible after a disaster.
 - b. Regularly update and test the recovery plan to ensure its effectiveness.
13. Public Awareness Campaigns
 - a. Telecoms can play a crucial role in raising public awareness about disaster preparedness. This could involve sending out informational messages, hosting webinars, or collaborating with local authorities to disseminate relevant information.
14. Partnerships with Tech Companies
 - a. Telecoms can partner with tech companies to leverage advanced technologies like AI, IoT, and big data analytics. These partnerships can lead to the development of innovative solutions for disaster management.
15. Investment in Research and Development
 - a. Telecoms should consider investing in research and development to stay ahead of the curve in disaster management technologies. This could involve funding academic research, hosting hackathons, or setting up internal R&D (Research & Development) departments.

- 16. Regular Audits and Evaluations
 - a. To ensure the effectiveness of their disaster management strategies, telecoms should conduct regular audits and evaluations. This will help identify any gaps or areas for improvement.
- 17. Community Engagement
 - a. Engaging with the community can provide valuable insights into the unique needs and challenges of different regions. This could involve hosting community meetings, conducting surveys, or setting up community liaison roles within the company.
- 18. Policy Advocacy
 - a. Telecoms can advocate for policies that support effective disaster management. This could involve lobbying for regulatory changes, participating in policy discussions, or collaborating with other organizations to push for policy reforms.
- 19. Employee Training and Support
 - a. Employees play a crucial role in disaster management. Telecoms should ensure that their employees are well-trained and supported to handle disaster situations. This could involve providing regular training, mental health support, and clear communication about roles and responsibilities during a disaster.
- 20. Sustainability and Climate Resilience
 - a. With the increasing impact of climate change, telecoms need to ensure that their infrastructure and operations are sustainable and climate resilient. This could involve investing in renewable energy, improving energy efficiency, or designing infrastructure to withstand extreme weather events.

Preparedness Recommendations by Disaster Category

Earthquake

- ✔ Ensure backup power sources for telecommunication infrastructure, such as solar panels, batteries, generators, and fuel cells.
- ✔ Use alternative communication channels in case of network disruption, such as amateur radio, satellite phones, and mobile ad hoc networks.
- ✔ Design resilient network architecture that can withstand damage and reroute traffic, such as redundancy, diversity, and flexibility of network components and routes.

- ✓ Implement a national emergency telecommunication plan (NETP) that defines the roles and responsibilities of different stakeholders, such as government agencies, operators, regulators, and humanitarian organizations, in an earthquake.
- ✓ Conduct regular risk assessments and vulnerability audits of telecommunication infrastructure and identify the areas that need reinforcement or relocation.
- ✓ Establish a rapid response team that can be deployed to the affected areas to assess the damage and provide emergency assistance.
- ✓ Coordinate with other operators and service providers to share resources and information, and to avoid duplication of efforts.

Tsunami

- ✓ Ensure backup power sources for telecommunication infrastructure, especially in coastal areas, such as solar panels, batteries, generators, and fuel cells.
- ✓ Use alternative communication channels in case of network disruption, such as amateur radio, satellite phones, and mobile ad hoc networks.
- ✓ Design resilient network architecture that can withstand damage and reroute traffic, such as redundancy, diversity, and flexibility of network components and routes.
- ✓ Establish an effective early warning system that can alert the population and authorities of an impending tsunami, using various sensors, such as seismometers, tide gauges, and buoys, and various media, such as sirens, radio, television, SMS, and social media.
- ✓ Install tsunami-resistant telecommunication infrastructure, such as elevated towers, waterproof cables, and floating platforms, in the coastal areas.
- ✓ Educate the population and authorities on how to use the early warning system and the alternative communication channels and conduct drills and simulations to test their effectiveness.
- ✓ Support the recovery and reconstruction efforts by providing telecommunication services to the affected communities and humanitarian organizations.

Cyclone

- ✓ Ensure backup power sources for telecommunication infrastructure, especially in areas prone to intense winds, heavy rains, and flooding, such as solar panels, batteries, generators, and fuel cells.
- ✓ Use alternative communication channels in case of network disruption, such as amateur radio, satellite phones, and mobile ad hoc networks.
- ✓ Design resilient network architecture that can withstand damage and reroute traffic, such as redundancy, diversity, and flexibility of network components and routes.
- ✓ Develop a robust disaster recovery plan that can restore the telecommunication services as soon as possible after a cyclone, deploying emergency telecommunication equipment, such as mobile base stations, satellite terminals, and portable radios, to the affected areas, and repairing or replacing the damaged infrastructure, such as poles, cables, and antennas, with the help of trained personnel and volunteers.
- ✓ Monitor the weather forecasts and alerts and prepare contingency plans for different scenarios and levels of severity.
- ✓ Secure the telecommunication infrastructure from potential damage, such as by anchoring poles, burying cables, and covering antennas, and remove any hazards or obstacles that could cause further damage.
- ✓ Assess the impact of the cyclone on the telecommunication services and prioritize the restoration of the most critical and essential services, such as emergency calls, health care, and public safety.

Conclusion

Telecommunication is a vital tool for disaster preparedness and response, as it enables reliable communication infrastructure, mobile communication solutions, Internet of Things (IoT) technology, artificial intelligence (AI) and big data analytics, and other emerging technologies, to enhance the effectiveness and efficiency of disaster management efforts. However, there are also some challenges and opportunities that need to be addressed, such as accessibility and affordability, security and privacy, regulation and coordination, and innovation and collaboration. By overcoming these challenges and seizing these opportunities, telecommunication can play a significant role in reducing the human suffering and economic losses caused by disasters and building a more resilient and sustainable future.

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ABOUT US

Improvement and Innovation, **The Process Re-engineering Team (Intelligent Operations)** is at the forefront of adopting cutting-edge methodologies and technologies. This forward-thinking approach not only supports the organization's immediate objectives but also positions it to anticipate and react to future challenges.

By fostering a culture of innovation, the team ensures that process optimization is not a one-time endeavor but a sustainable, ongoing process that evolves with the changing business landscape.

The Process Re-engineering Team is a pivotal element in the organization's strategy for operational excellence and market leadership. Through their diverse expertise, strategic alignment, and unwavering focus on innovation and customer satisfaction, they spearhead initiatives that transform processes, drive efficiencies, and deliver tangible outcomes. This team exemplifies the dynamic capabilities necessary for navigating the complexities of modern business environments, making them indispensable to achieving the organization's long-term objectives.



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