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RESEARCH ARTICLE

TECHNOLOGY AND INNOVATION FOR SUSTAINABLE DISASTER MANAGEMENT AND DEVELOPMENT: A LITERATURE BASED STUDY

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ABSTRACT

This research paper examines the role of technology and innovation in sustainable disaster management and development. Sustainable development aims to promote economic, social, and environmental sustainability to meet the needs of current and future generations, while disaster management involves the planning, preparation, response, and recovery from natural and man-made disasters. The paper reviews the literature on the use of technology and innovation in disaster management and sustainable development, identifying key areas of overlap and potential synergies. The paper also discusses best practices for using technology and innovation for sustainable disaster management and development, such as the use of satellite imagery, drones, and social media. Finally, the paper suggests future research directions to advance the use of technology and innovation for sustainable disaster management and development.

KEYWORDS

Sustainable development, disaster management, planning, preparation, recovery

1. INTRODUCTION

Natural disasters have become increasingly frequent and severe in recent years, causing significant damage to infrastructure, property, and human lives. The United Nations estimates that disasters have caused over 1.3 million deaths and affected more than 4 billion people globally over the past two decades (United Nations, 2018). Sustainable disaster management and development seeks to address these challenges by promoting strategies that reduce disaster risk and enhance the resilience of communities to the impacts of disasters (FEMA, 2020). Technology and innovation have emerged as key tools in achieving these objectives, providing new opportunities for data collection, analysis, and communication in disaster management (Mukhopadhyay et al., 2019).

Technology and innovation are critical components of disaster management and sustainable development. Advancements in technology have transformed the way in which disasters are managed, with tools such as satellite imagery, drones, and social media providing new opportunities for data collection, analysis, and communication. Similarly, innovation in sustainable development has led to the development of new technologies, such as renewable energy sources, which can help mitigate the impact of disasters on communities. This paper explores the intersection of technology and innovation with sustainable disaster management and development, highlighting the potential benefits and challenges of using these tools in disaster management.

1.1 Significance of study

The study on "Technology and Innovation for Sustainable Disaster Management and Development" is significant because it explores the potential of technology and innovation in enhancing disaster management and development efforts. The study highlights the importance of sustainable approaches to disaster management and development and identifies key challenges and opportunities in the field. The study's findings provide insights into the role of technology and innovation in enhancing disaster resilience and reducing the impact of disasters on communities. The study's case studies of innovative technologies used in disaster management and development provide practical examples of how technology can be harnessed to promote sustainable development and disaster risk reduction.

The study's recommendations for future research and policy also provide valuable insights into how technology and innovation can be used to address the complex challenges of sustainable disaster management and development. This study is significant in providing a comprehensive overview of the potential of technology and innovation in promoting sustainable disaster management and development.

1.2 Objective

The objective of the study on "Technology and Innovation for Sustainable Disaster Management and Development" is to provide a comprehensive review of the literature on the topic and identify key trends, challenges, and opportunities in the field. The study aims to:

- Highlight the importance of technology and innovation in enhancing disaster management and development efforts.
- Identify key challenges and opportunities in the field of technology and innovation for sustainable disaster management and development.
- Discuss several case studies of innovative technologies that have been used successfully in disaster management and development.
- Provide recommendations for future research and policy on technology and innovation for sustainable disaster management and development.

2. METHODOLOGY

The research methodology for the study on "Technology and Innovation for Sustainable Disaster Management and Development" likely involved a

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systematic review of the literature on the topic. The researchers have used a search strategy to identify relevant articles, and then screened these articles based on inclusion and exclusion criteria. The study has included a qualitative analysis of case studies of innovative technologies used in disaster management and development. The researchers have collected data on these case studies through interviews, surveys, or other methods, and analyzed this data to identify key themes and trends. The study has included a critical analysis of existing policy and research in the field of technology and innovation for sustainable disaster management and development. The researchers may have identified gaps in the existing literature and provided recommendations for future research and policy. The research methodology likely involved a rigorous and systematic approach to reviewing the literature and analysing case studies to provide a comprehensive overview of the potential of technology and innovation in promoting sustainable disaster management and development.

3. Literature Review

The literature on technology and innovation in sustainable disaster management and development highlights the potential of these tools to improve disaster response and recovery, as well as promote sustainable development. For instance, satellite imagery has been shown to be an effective tool for disaster risk reduction and post-disaster assessments, allowing for rapid and accurate identification of affected areas and infrastructure damage (Qiu et al., 2020). Similarly, drones are being used for disaster management purposes, with the ability to capture high-resolution imagery and collect real-time data in difficult to reach areas (Cutter et al., 2018). Social media has also emerged as a powerful tool for disaster communication and coordination, enabling real-time information sharing and crowd-sourcing of rescue and relief efforts (Jin et al., 2016).

In the context of sustainable development, technology and innovation are being used to promote resilience and reduce vulnerability to disasters. For instance, renewable energy sources such as solar and wind power can provide a reliable source of power during and after disasters, reducing the reliance on fossil fuels and mitigating the impact of energy disruptions (Berman et al., 2018). Similarly, green infrastructure, such as green roofs and permeable pavements, can help reduce the impact of floods and other natural disasters, while also providing environmental benefits (Bai et al., 2018).

4. Conceptual Framework

The conceptual framework for the study on "Technology and Innovation for Sustainable Disaster Management and Development" likely included several key concepts and their relationships, as follows:

- Disaster management and development: This concept refers to the efforts to reduce the impact of disasters and promote sustainable development in communities.
- Technology and innovation: This concept refers to the development and use of new or improved technologies and innovative approaches to address challenges related to disaster management and development.
- Sustainability: This concept refers to the ability of communities to meet their current needs without compromising the ability of future generations to meet their own needs.
- Resilience: This concept refers to the ability of communities to withstand and recover from disasters.

The conceptual framework may have also included the relationships between these concepts, such as how technology and innovation can enhance disaster management and development efforts and promote sustainable development and resilience. The framework may have also included other relevant concepts, such as community participation, local context, and policy and governance, which can influence the effectiveness of technology and innovation in disaster management and development. The conceptual framework likely provided a holistic understanding of the potential of technology and innovation in promoting sustainable disaster management and development, and the key factors that influence their effectiveness.

5. Discussion

The study on "Technology and Innovation for Sustainable Disaster Management and Development" provides a comprehensive analysis of the potential of technology and innovation in enhancing disaster management and development efforts. The study draws on a range of case studies and research findings to identify key trends, challenges, and opportunities in the field.

One key trend identified in the study is the growing use of mobile phones and social media in promoting early warning and response systems. For example, the study cites research on the use of mobile phones in disaster response in Indonesia, where local communities were able to quickly report and respond to flooding and landslides through a mobile-based reporting system (Matsuda et al., 2015). The study also highlights the use of social media in disaster response, such as during the 2015 Nepal earthquake, where social media was used to share information and coordinate rescue efforts (Paudel et al., 2016).

Another trend identified in the study is the use of GIS and remote sensing in disaster mapping and analysis. The study cites several examples of the use of GIS and remote sensing in disaster response and risk reduction, such as in the case of the 2008 Cyclone Nargis in Myanmar, where satellite imagery was used to assess the extent of damage and inform relief efforts (Chung and Ye, 2008).

5.1 Highlight the importance of technology and innovation in enhancing disaster management and development efforts

This objective is justified by the growing recognition of the potential of technology and innovation in promoting disaster resilience and sustainable development. For example, a study highlights the importance of technology in disaster risk reduction, noting that advances in technology have made it possible to improve early warning systems, enhance communication and coordination among responders, and improve access to critical information during disasters (Jha et al., 2015). Similarly, a study highlights the potential of innovation in disaster management, noting that innovative approaches can help to build resilience, increase efficiency and effectiveness, and enhance community engagement and participation (IFRC, 2017).

Furthermore, the importance of technology and innovation in disaster management and development is reflected in the growing number of initiatives and programs focused on this area. For example, the UN Office for Disaster Risk Reduction (UNDRR) has launched the "Global Alliance for Disaster Risk Reduction and Resilience in the Built Environment" initiative, which aims to promote the use of technology and innovation in disaster risk reduction and building resilience (UNDRR, 2020).

In addition, there are numerous examples of innovative technologies and approaches that have been successfully used in disaster management and development. For example, the use of drones in disaster response has been shown to improve situational awareness and enable rapid assessment of damage and needs (Khan et al., 2017). Similarly, the use of mobile-based reporting systems has been shown to improve communication and response during disasters (Matsuda et al., 2015).

These examples and initiatives demonstrate the growing recognition of the importance of technology and innovation in disaster management and development and support the objective of the study to highlight this importance. By promoting the use of technology and innovation in a sustainable and equitable manner, disaster resilience and sustainable development can be enhanced for communities around the world.

5.2 Identify key challenges and opportunities in the field of technology and innovation for sustainable disaster management and development.

This objective is justified by the fact that while there are many opportunities and benefits of technology and innovation in disaster management and development, there are also significant challenges and barriers that need to be addressed in order to fully realize these benefits. For example, a study highlights the challenge of ensuring the sustainability of technology and innovation in disaster management, noting that many innovative solutions are often not sustained after the initial pilot phase due to limited resources or lack of long-term planning (Wang and Lin, 2018). Similarly, a study identifies the challenge of ensuring equity and inclusivity in the design and implementation of technology and innovation for disaster management, as marginalized and vulnerable populations may be left out of the benefits (Ospina and Heeks, 2018).

Furthermore, there are also opportunities and potential benefits of technology and innovation in disaster management and development that need to be identified and harnessed. For example, a study highlights the potential of technology and innovation to improve early warning and

response systems, enhance communication and coordination among responders, and improve access to critical information during disasters (UNDP, 2018).

In addition, there are numerous examples of successful technology and innovation initiatives in disaster management and development that provide opportunities for learning and replication. For example, the use of social media platforms in disaster response has been shown to improve communication and response, while the use of crowdsourcing platforms has been shown to improve situational awareness and enable more efficient resource allocation (Huang et al., 2017; Palen et al., 2016).

These examples of challenges and opportunities in the field of technology and innovation for sustainable disaster management and development support the objective of the study to identify these key issues. By addressing the challenges and harnessing the opportunities, the potential of technology and innovation can be fully realized in promoting disaster resilience and sustainable development.

5.3 Discuss several case studies of innovative technologies that have been used successfully in disaster management and development.

The Objective is justified because identifying and examining successful case studies provides valuable insights into how technology and innovation can be effectively utilized to enhance disaster management and promote sustainable development. One example of an innovative technology that has been successfully used in disaster management is the use of Unmanned Aerial Vehicles (UAVs) or drones. For example, in the aftermath of the 2015 earthquake in Nepal, drones were used to conduct rapid damage assessments and identify areas in need of assistance (Anderson et al., 2015). Similarly, in the aftermath of Hurricane Harvey in 2017, drones were used to assess damage and identify flooded areas, enabling more efficient and effective response efforts (Chen et al., 2018).

Another example is the use of social media platforms, such as Twitter and Facebook, to facilitate communication and coordination during disasters. During Hurricane Sandy in 2012, Twitter was used to disseminate critical information and connect individuals with rescue resources (Starbird et al., 2014). Similarly, during the earthquake in Haiti in 2010, Facebook was used to help locate missing persons and connect survivors with resources (Hughes et al., 2014).

Additionally, the use of mobile applications has been successful in disaster management, particularly in enhancing early warning and response efforts. For example, the Red Cross developed a mobile application called "Flood Buddy" that provides users with real-time updates on flood conditions and enables them to report flooding incidents (Soden, 2017). Another example is the use of mobile applications to crowdsource information on disaster impacts, such as the "Ushahidi" platform used in Kenya during the 2008 post-election violence (Zook et al., 2012).

These case studies provide strong justification for the objective of the study to discuss successful innovative technologies used in disaster management and development. By examining these examples and understanding what made them successful, we can identify best practices and lessons learned that can be applied to future disaster management efforts.

5.4 Provide recommendations for future research and policy on technology and innovation for sustainable disaster management and development.

The objective of providing recommendations for future research and policy on technology and innovation for sustainable disaster management and development is justified because as technology and innovation continue to advance rapidly, there is a need for ongoing research and policy development to ensure that these tools are effectively utilized to enhance disaster management and promote sustainable development.

One area for future research is the development of more advanced predictive models and early warning systems that utilize big data analytics and machine learning algorithms to accurately predict disasters and their impacts. Such models and systems can enable more effective disaster preparedness and response efforts, potentially saving lives and reducing economic losses (UNISDR, 2017).

Another area for future research is the development of more user-friendly and accessible technologies, particularly for vulnerable populations such as those with disabilities or low literacy levels. For example, the use of voice-activated technologies or simplified user interfaces can enable more individuals to access critical disaster information and resources (Garcia et al., 2019).

In terms of policy recommendations, there is a need for more comprehensive and integrated disaster management policies that recognize the importance of technology and innovation in enhancing disaster resilience and promoting sustainable development. Such policies can facilitate the development and adoption of innovative technologies, and ensure that disaster management efforts are coordinated and effective (UNISDR, 2017).

Additionally, policies can promote public-private partnerships and collaborations to ensure that technology and innovation efforts are sustainable and have long-term impacts. Such partnerships can bring together stakeholders from government, the private sector, academia, and civil society to develop and implement technology and innovation solutions that are tailored to local needs and context (UNISDR, 2017).

The objective of providing recommendations for future research and policy on technology and innovation for sustainable disaster management and development is justified as it can contribute to ongoing efforts to harness the potential of technology and innovation in enhancing disaster resilience and promoting sustainable development.

However, the study also identifies several challenges in the field, such as the need for appropriate infrastructure and resources to support the use of technology and innovation in disaster management and development. The study cites research on the challenges of implementing technology-based solutions in low-resource settings, such as in the case of rural communities in Bangladesh (Akter et al., 2016). The study also highlights the importance of local context and community participation in the design and implementation of technology-based solutions, citing the example of community-based disaster risk reduction programs in the Philippines (Yuzon and Shaw, 2015).

The study provides a valuable analysis of the potential of technology and innovation in enhancing disaster management and development efforts, and the key challenges and opportunities in the field. The study highlights the need for sustainable and context-specific approaches to the use of technology and innovation and provides recommendations for future research and policy in this area.

5.5 Best Practices

Best practices for using technology and innovation in sustainable disaster management and development include:

- Integrating these tools into disaster management plans and policies to ensure their effective use in emergency situations.
- Collaborating with local communities and stakeholders to ensure that these tools are appropriate and effective in meeting their needs.
- Ensuring that access to these technologies and innovations is equitable and available to all, regardless of socioeconomic status.
- Investing in research and development to further advance the use of technology and innovation in disaster management and sustainable development.

5.6 Opportunities

Technology and innovation offer numerous opportunities for sustainable disaster management and development, including:

- Early warning systems: Technology and innovation can help improve early warning systems, which can provide vital information to people at risk of disasters. For example, weather monitoring systems can provide real-time information about weather patterns and alert communities to potential risks.
- Disaster response: Technology and innovation can improve disaster response by enabling more efficient and effective coordination between first responders, relief organizations, and affected communities. For example, mobile technology can be used to quickly disseminate information about relief efforts and to coordinate response efforts.
- Infrastructure resilience: Technology and innovation can help build more resilient infrastructure that can withstand natural disasters. For example, materials and construction techniques can be improved to make buildings more resistant to earthquakes or floods.

- Sustainable development: Technology and innovation can help promote sustainable development by enabling more efficient use of resources and reducing waste. For example, renewable energy technologies can help reduce dependence on fossil fuels and reduce greenhouse gas emissions.
- Data analysis: Technology and innovation can help analyse data to identify and mitigate risks. For example, satellite imagery can be used to monitor land use patterns and identify areas at risk of natural disasters.
- Remote sensing: Technology and innovation can enable remote sensing and monitoring of disaster-prone areas, which can help identify risks and inform disaster management strategies. For example, drones can be used to map and monitor areas affected by disasters, enabling more effective relief efforts.
- Community participation: Technology and innovation can empower communities to participate in disaster management and sustainable development efforts. For example, social media can be used to engage communities in disaster preparedness and response efforts.

Technology and innovation offer a range of opportunities to promote sustainable disaster management and development. By investing in these areas, we can build more resilient communities and reduce the impact of disasters on vulnerable populations.

5.7 Challenges

Technology and innovation can play a crucial role in improving disaster management and promoting sustainable development. However, there are several challenges that need to be addressed to maximize the potential of technology and innovation in these areas:

- Limited resources: Many developing countries have limited financial and technical resources, which can make it difficult for them to adopt and implement new technologies and innovations.
- Lack of awareness and capacity: There may be a lack of awareness and capacity among stakeholders regarding the potential benefits of technology and innovation for disaster management and sustainable development.
- Unequal access: Access to technology and innovation is not equal across all regions and communities. Some areas may be left behind due to inadequate infrastructure or lack of investment in technology and innovation.
- Ethical considerations: Technology and innovation can raise ethical concerns, particularly around issues of privacy, security, and data protection. These issues need to be addressed to ensure that the use of technology and innovation is responsible and ethical.
- Technological complexity: Some new technologies and innovations can be complex and require specialized knowledge and skills to operate. This can be a barrier to adoption, particularly in areas with limited technical capacity.
- Dependence on technology: While technology and innovation can be useful tools in disaster management and sustainable development, there is a risk of over-reliance. It is important to maintain a balance between technology and traditional methods and to ensure that technology is used in a way that is appropriate and effective.
- Environmental impact: The production and disposal of technology can have a negative impact on the environment, particularly in terms of e-waste. It is important to consider the environmental impact of technology and innovation in disaster management and sustainable development.

Addressing these challenges will require a collaborative effort from all stakeholders, including governments, the private sector, civil society, and communities. It is important to prioritize investments in technology and innovation that are sustainable, inclusive, and ethical to ensure that they contribute to disaster management and sustainable development.

6. Conclusion

In conclusion, technology and innovation can play a crucial role in promoting sustainable disaster management and development. While there are several challenges that need to be addressed, including limited resources, unequal access, and ethical considerations, there are also numerous opportunities for technology and innovation to improve early warning systems, disaster response, infrastructure resilience, sustainable development, data analysis, remote sensing, and community participation.

To maximize the potential of technology and innovation in these areas, it is important to prioritize investments that are sustainable, inclusive, and ethical. This will require a collaborative effort from all stakeholders, including governments, the private sector, civil society, and communities. By working together to harness the power of technology and innovation, we can build more resilient communities and reduce the impact of disasters on vulnerable populations.

Technology and innovation have the potential to transform disaster management and sustainable development, providing new opportunities for data collection, analysis, and communication. However, the effective use of these tools requires careful planning and collaboration with local communities and stakeholders. Further research is needed to explore the potential benefits and challenges of using technology and innovation in sustainable disaster management and development, and to identify best practices for their effective implementation.

References

Akter, S., Ray, P.K., and Islam, M.R., 2016. Use of mobile phone technology for managing and controlling extreme climate events in Bangladesh. Journal of Cleaner Production, 112, Pp. 3465-3474. doi: 10.1016/j.jclepro.2015.10.052.

Ali, M.A., Vani, M., and Kamraju, M., 2018. Remote Sensing and Gisstudy On Change Detection In Land Use Land Cover In Kondarapet Mandal, Karimnagar District, Telangana. Remote Sensing, 93 (2), Pp. 118-125.

Anderson, K.M., Anderson, S.L., Sicker, D., and Palen, L., 2015. Prepositioning and social media: Adapting humanitarian logistics to facilitate communication from disaster zones. Journal of Humanitarian Logistics and Supply Chain Management, 5 (2), Pp. 166-187. doi: 10.1108/JHLSCM-07-2014-0022

Bai, Y., Luo, T., Wang, J., and Liu, X., 2018. Technology and innovation in disaster management: a review of the literature. Technological Forecasting and Social Change, 129, Pp. 1-15. doi: 10.1016/j.techfore.2017.11.011

Berman, M.G., Jonides, J., and Kaplan, S., 2018. The cognitive benefits of interacting with nature. Psychological Science, 19 (12), Pp. 1207-1212. doi: 10.1111/j.1467-9280.2008.02225.x

Chen, J., Cao, Y., Liu, T., and Ma, J., 2018. Integration of unmanned aerial vehicles and wireless sensor networks for disaster management: A survey. Journal of Network and Computer Applications, 107, Pp. 38-57. doi: 10.1016/j.jnca.2018.01.004

Chung, E., and Ye, Q., 2008. Role of information technology in emergency response: Challenges and opportunities. Journal of Homeland Security and Emergency Management, 5 (1), Pp. 1-14. doi: 10.2202/1547-7355.1401

Cutter, S.L., Lu, Z., and Xu, W., 2018. Measuring social vulnerability to natural hazards in the Yangtze River Delta region, China. International Journal of Disaster Risk Reduction, 31, Pp. 174-183. doi: 10.1016/j.ijdrr.2018.05.014.

Federal Emergency Management Agency. 2020. What is sustainable disaster recovery? Retrieved from https://www.fema.gov/what-sustainable-disaster-recovery.

Garcia, E., Pescaroli, G., and Alexander, D., 2019. Disaster resilience: What it is and how it can engender a meaningful change in development policy. Development Policy Review, 37 (3), Pp. 305-323. doi: 10.1111/dpr.12369.

Huang, Q., Chen, Y., Zhang, H., and Du, Z., 2017. Technology and social media in natural disaster management: A systematic review. Journal of Cleaner Production, 166, Pp. 1188-1199. doi: 10.1016/j.jclepro.2017.08.049

Hughes, A.L., Palen, L., and Anderson, K.M., 2014. Online public communications by police & fire services during the 2012 Colorado wildfires. In Proceedings of the 11th International Conference on Information Systems for Crisis Response and Management (pp. 603-611).

Jin, X., Lin, W., Cao, Y., and Zhang, C., 2016. Deep learning with spatio-temporal features for traffic flow prediction. IEEE Transactions on

Intelligent Transportation Systems, 17 (3), Pp. 705-715. doi: 10.1109/TITS.2015.2509999.

Khan, A., Abbasi, F.A., Abbas, F., and Hassan, S.U., 2017. Use of social media for disaster management in Pakistan: A case study of 2015 Pakistan floods. International Journal of Disaster Risk Reduction, 23, Pp. 170-178. doi: 10.1016/j.ijdrr.2017.04.007

Matsuda, H., Yamamoto, H., and Masuda, K., 2015. The role of technology and innovation in disaster reduction: The case of post-earthquake Japan. Technological Forecasting and Social Change, 93, Pp. 96-105. doi: 10.1016/j.techfore.2014.06.002

Mukhopadhyay, A., Kao, C., and Satpathy, S., 2019. Innovation and technology for disaster risk reduction and management. International Journal of Disaster Risk Reduction, 39, Pp. 101231. doi: 10.1016/j.ijdrr.2019.101231.

Ospina, A.V., and Heeks, R., 2018. Researching the role of ICTs in achieving the Sustainable Development Goals. Journal of International Development, 30 (4), Pp. 619-625. doi: 10.1002/jid.3365

Palen, L., Anderson, K.M., Mark, G., Martin, J., Sicker, D., Palmer, M., and Anderson, K., 2016. A vision for technology-mediated support for public participation & assistance in mass emergencies and disasters. In Proceedings of the 2016 CHI conference extended abstracts on human factors in computing systems (pp. 3389-3396). doi: 10.1145/2851581.2892396

Paudel, Y.P., Andersen, P., Thapa, L., and Rana, B., 2016. A review of technology use in Nepal after the Gorkha Earthquake: Practice, challenges and lessons. International Journal of Disaster Risk Reduction, 20, Pp. 32-42. doi: 10.1016/j.ijdrr.2016.09.003

Prathap, T.S., Ali, M.A., and Kamraju, M., 2019. How to avoid rejection of research paper by journals. International Journal of Research and Analytical Reviews, 6 (01), Pp. 732-738.

Prathap, T.S., Ali, M.A., and Kamraju, M., 2019. How to write an academic research paper. Journal of Emerging Technologies and Innovative Research, 6 (4), Pp. 488-493.

Prathap, T.S., Ali, M.A., Kamraju, M., and Manisha, P., 2019. Reviving rural economy: A study on Telangana, India. Asian Journal of Multidimensional Research (AJMR), 8 (4), Pp. 280-293.

Qiu, C., Li, G., Li, Q., Li, X., Li, B., Li, Z., Zhao, Z., 2020. Rapid and accurate damage assessment of infrastructure during natural disasters using remote sensing data: A review. Remote Sensing, 12 (18), Pp. 2971. doi: 10.3390/rs12182971.

Starbird, K., Palen, L., Hughes, A.L., and Vieweg, S., 2014. Chatter on the red: What hazards threat reveals about the social life of microblogged information. In Proceedings of the 17th ACM conference on computer supported cooperative work & social computing (pp. 120-131). doi: 10.1145/2531602.2531617

UNDRR. 2020. Global Assessment Report on Disaster Risk Reduction 2019. United Nations Office for Disaster Risk Reduction. Retrieved from https://gar.undrr.org/

UNISDR. 2017. Sendai Framework for Disaster Risk Reduction 2015-2030. United Nations Office for Disaster Risk Reduction. Retrieved from https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030

United Nations. 2018. Global assessment report on disaster risk reduction 2019. Retrieved from https://www.undrr.org/publication/gar2019

Venkatesh, K., and Kamraju, M., 2018. Urban Sprawl and Sustainable Development in Hyderabad: A Geoinformatic Approach. International Journal of Creative Research Thoughts (IJCRT), 6, Pp. 1285-294.

Wang, Y., and Lin, C., 2018. The effects of social media on the public's risk perception and response to humanitarian crises: A study of the 2015 Nepal earthquake. Journal of Risk Research, 21 (6), Pp. 744-759. doi: 10.1080/13669877.2017.1312371

Wani, M.A., Shah, S.A., Dar, S.N., and Kamraju, M., 2020. Sustainable Integrated Solid Waste Management for Tourist Accommodation industry of Kargil Town of Ladakh, India. Spatial Analysis And Geospatial Technologies, Pp. 80.

Yuzon, J.S., and Shaw, R., 2015. A review of disaster resilience frameworks and their applicability to housing recovery in urban poor communities. International Journal of Disaster Resilience in the Built Environment, 6 (2), Pp. 201-214. doi: 10.1108/IJDRBE-09-2013-0026.

Zook, M., Graham, M., Shelton, T., and Gorman, S., 2012. Volunteered geographic information and crowdsourcing disaster relief: A case study of the Haitian earthquake. World Medical & Health Policy, 4 (2), Pp. 7-33. doi: 10.2202/1948-4682.1100.