HUMAN RIGHTS IN THE GLOBAL SOUTH, 3:2 (2024), 149-168
https://doi.org/10.56784/hrgs.v3i2.99
ISSN 2962-5556 (Online)
Available online 31 December 2024

ARTICLE

Leveraging Emerging Technologies to Document Abuses and Amplify Marginalised Voices in Conflict Zones: Lessons from Afghanistan

Murtaza Mohiqi *)
School of Business and Law, University of Agder, Norway

*) **Corresponding author**, email**:** murtaza.mohiqi@uia.no
Submitted: 21 September 2024 | **Reviewed:** 11 October 2024 | **Revised:** 24 November 2024 | **Accepted:** 26 December 2024

Abstract
This study critically examines the specific role of emerging technologies in safeguarding human rights amidst conflict, with a focus on Afghanistan as a compelling case study. Technology is explored not merely as a passive recorder but as an active agent of accountability, employing innovative applications like artificial intelligence and blockchain to ensure evidence integrity and strengthen legal recourse. Beyond traditional social media, the research highlights the transformative potential of technologies such as virtual reality and immersive storytelling in amplifying marginalised voices, providing these communities with platforms to share their experiences more effectively and engage global audiences. The study also investigates context-specific communication strategies, showcasing how secure channels, mesh networks, and satellite communication help overcome barriers in conflict zones and ensure resilient information flow and emergency response. By analysing the Afghanistan case study, the research offers a critical examination of the ethical challenges, operational barriers, and practical implications associated with deploying these technologies. This article contributes to the growing interdisciplinary literature at the intersection of technology, human rights, and conflict by offering one of the first comprehensive analyses of how diverse digital tools function not only as evidentiary instruments but as mechanisms of empowerment and protection in fragile settings. This analysis underscores the importance of a balanced and contextually nuanced approach, addressing not only the opportunities but also the limitations and risks—such as ethical concerns, sustainability, and accessibility—in leveraging technology for human rights protection. The findings offer actionable insights for policymakers, human rights practitioners, and technologists, providing a roadmap for strategically integrating technology into human rights efforts to create a more just and equitable response to conflict.

Keywords: Communication; Conflict Zone; Digital Accountability; Human Rights; Marginalised Voices.

Cite this article: Murtaza Mohiqi, "Leveraging Emerging Technologies to Document Abuses and Amplify Marginalized Voices in Conflict Zones: Lessons from Afghanistan," *Human Rights in the Global South* 3, no. 2 (2024): 29-48, https://doi.org/10.56784/hrgs.v3i2.99.

INTRODUCTION

The protection of human rights in conflict zones remains a critical global challenge, as the collapse of legal systems and governance structures leads to widespread abuses. Civilians, particularly vulnerable groups, often face extrajudicial killings, torture, sexual violence, and forced displacement. In such environments, the suppression of freedoms such as speech, assembly, and access to information further exacerbates the situation, making it difficult to document abuses or seek assistance. Several countries with protracted conflicts, including Afghanistan[1], Syria, Yemen, and the Democratic Republic of Congo, after decades of conflict, stand as a stark example of how human rights violations proliferate in such environments. Effective protection of these rights requires innovative approaches and sustained international commitment.[2]

The use of technology to safeguard human rights has been the focus of growing attention. Technologies such as artificial intelligence (AI), blockchain, and digital forensics are proving to be powerful tools for documentation and accountability in conflict zones. AI, for instance, can analyse satellite imagery to detect and verify incidents of mass violence or destruction, while digital forensics plays a crucial role in validating evidence gathered from social media or mobile devices.[3] However, despite these technological advancements, most of the research[4] has been broad, often lacking focus on specific conflict zones like Afghanistan. For example, issues like data privacy, risks of authoritarian surveillance, and the cultural and legal barriers to adopting these technologies in fragile contexts remain underexplored.[5]

This study addresses these limitations by exploring the role of technology in human rights protection with a specific focus on Afghanistan. It aims to provide a theoretical analysis rather than a practical, data-driven approach, critically examining the potential and challenges of using technology in conflict zones. The research contributes to the field by discussing the transformative power of emerging

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1 In Afghanistan, the civil war exacerbated ethnic divisions, as armed groups often organised along ethnic lines. However, the root causes of the conflict were political and social, with external actors instrumentalising ethnic identities to mobilise support. The breakdown of security structures and competition for resources created a security dilemma, intensifying violence and human rights abuses (Afsah and Guhr, 2005). For more details, see: Afsah, Ebrahim, and Alexandra Hilal Guhr, Afghanistan: Building a State to Keep the Peace, Max Planck Yearbook of United Nations Law, vol. 9, 2005, pp. 373–456. Available at SSRN: https://ssrn.com/abstract=2373771.

2 Human Rights Watch, 'Afghanistan: Events of 2024', in *World Report 2025*, 2024, https://www.hrw.org/world-report/2025/country-chapters/afghanistan.

3 Thiri Shwesin Aung et al., 'Using Satellite Data and Machine Learning to Study Conflict-Induced Environmental and Socioeconomic Destruction in Data-Poor Conflict Areas: The Case of the Rakhine Conflict', *Environmental Research Communications* 3, no. 2 (March 2021): 025005, https://doi.org/10.1088/2515-7620/abedd9.

4 For an in-depth discussion on the use of AI in human rights monitoring, see Anne Dulka's article, "The Use of Artificial Intelligence in International Human Rights Law," published in the Stanford Technology Law Review (2023). Stanford Law School.

5 Ethical and region-specific concerns surrounding the use of AI and blockchain for human rights remain underexplored in existing research. For instance, Roumate (2020) examines the intersection of AI ethics and international human rights law, emphasising the need for robust legal frameworks to mitigate potential risks (International Review of Information Ethics). The European Parliamentary Research Service (2020) highlights gaps in ethical guidelines for AI, calling for global initiatives to address issues like bias, accountability, and the impact on vulnerable populations (European Parliament). Kriebitz and Lütge (2020) highlight that while AI offers significant benefits, it poses challenges like the potential for surveillance misuse, bias, and conflicts with fundamental human rights. They emphasise the need for companies and policymakers to develop frameworks that address these gaps, particularly in fragile and conflict-affected regions.

technologies, such as AI, blockchain, and virtual reality, in amplifying marginalised voices and fostering communication in areas with limited access.[6]

The objective of this study is to explore the theoretical applications of these technologies in conflict zones and to assess their potential impact on human rights protection in Afghanistan. Afghanistan presents a unique case due to its prolonged history of conflict, fragile governance, and complex socio-political dynamics, which make it a critical testing ground for such applications.[7] By analysing how these tools could be integrated into existing strategies, this research aims to offer insights into their practical implications, ethical considerations, and future potential. The discussion will be structured to first explore the technological landscape, followed by an examination of the challenges in deploying these tools in conflict settings and concluding with recommendations for policymakers and human rights practitioners.

METHODOLOGY

This study employs a theoretical and exploratory approach to examine the potential of technology in protecting human rights in conflict zones, with a particular focus on Afghanistan. It centres on a critical analysis of existing literature, theoretical frameworks, and case studies from similar contexts, providing a structured way to evaluate the impact of emerging technologies. The data being used in this research were collected through a literature review and analysis of relevant case studies, drawing on existing research and documented experiences in conflict zones such as Afghanistan.

This study conducts a comprehensive review of existing research and academic literature, examining the roles of AI, blockchain, digital forensics, and communication technologies in documenting human rights abuses while also addressing ethical considerations and challenges such as privacy, data security, and the potential misuse of these technologies. The study draws on documented examples from similar conflict zones, providing theoretical insights into the potential application of these technologies in Afghanistan.

The research employs a human rights and digital ethics framework, integrating perspectives from conflict resolution theory and technological determinism. This framework explores the intersection of technology, human rights, and conflict zones, providing a lens to evaluate both the opportunities and challenges of technology in safeguarding rights in fragile settings like Afghanistan.

The study utilises thematic analysis to identify and synthesise patterns and trends across the literature and case studies. For instance, the research examines how AI-driven tools could enhance evidence collection while addressing risks of privacy violations or potential misuse by authoritarian regimes. This approach ensures a balanced perspective, highlighting not only the transformative potential of these technologies but also their limitations and ethical complexities. A theoretical approach was chosen due to the lack of access to primary data in conflict zones like Afghanistan, where conducting fieldwork or stakeholder interviews poses significant logistical and ethical challenges. This approach enables a critical synthesis of secondary data while paving the way for future empirical studies once

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6 Adam Fejerskov, *The Global Lab: Inequality, Technology, and the New Experimental Movement* (Oxford University Press, 2022).

7 Thomas Barfield, *Afghanistan: A Cultural and Political History* (Princeton University Press, 2010), https://doi.org/10.1515/9781400834532.

conditions permit. By grounding the analysis in a theoretical framework, the study provides a conceptual foundation for understanding the role of technology in similar contexts.

TECHNOLOGY AS AN AGENT OF ACCOUNTABILITY

Afghanistan has endured a prolonged history of conflict, marked particularly by decades of civil war and political instability, which have led to pervasive human rights violations. These conflicts have resulted in widespread civilian casualties, the displacement of millions, and the suppression of fundamental rights such as freedom of speech, gender equality, and access to justice. Civil war has further exacerbated these issues, creating a cycle of violence that has disproportionately affected vulnerable populations.[8] These challenges underscore the urgent need for innovative solutions to document, preserve, and analyse evidence of such violations, thereby promoting accountability and justice.

Technology plays a pivotal role in ensuring accountability in conflict zones, with AI and blockchain significantly enhancing evidence collection and preservation.[9] AI's ability to rapidly analyse vast datasets, such as satellite imagery, helps identify human rights violations, while blockchain ensures the authenticity and immutability of digital evidence. These tools have been instrumental in documenting abuses in places like Afghanistan, supporting international legal efforts. However, challenges such as infrastructure limitations, data privacy concerns, and the legal acceptance of digital evidence require careful ethical considerations and context-specific solutions to fully realise their potential.[10]

A. Role of Artificial Intelligence and Blockchain in Ensuring Evidence Integrity

Artificial Intelligence (AI) and blockchain technology have revolutionised the collection, analysis, and preservation of evidence in conflict zones, providing critical tools for ensuring evidence integrity. AI can process vast amounts of data, identifying patterns and anomalies that human analysts might miss. For instance, AI has been utilised in Afghanistan to monitor the destruction of civilian infrastructure and track the movement of militant groups. AI-powered analysis of satellite imagery has documented the destruction of schools and hospitals, providing crucial evidence for international organizations.[11] Machine learning algorithms can analyse satellite imagery to detect signs of mass graves, destroyed infrastructure, or troop movements, providing critical evidence of human rights violations.[12] AI's

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8 Afghanistan - Building a State to Keep the Peace by Ebrahim Afsah, Alexandra Guhr :: SSRN', accessed 26 February 2025, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2373771.

9 Leon Witt et al., 'Blockchain and Artificial Intelligence: Synergies and Conflicts' (arXiv, 22 May 2024), https://doi.org/10.48550/arXiv.2405.13462.

10 Fabio Cristiano et al., eds., *Artificial Intelligence and International Conflict in Cyberspace* (Taylor & Francis, 2023), https://doi.org/10.4324/9781003284093; Jeroen Temperman and Alberto Quintavalla, eds., 'Bibliography', in *Artificial Intelligence and Human Rights* (Oxford University Press, 2023), 0, https://doi.org/10.1093/law/9780192882486.001.0001.

11 AI FOR PEACE NEWSLETTER Your Monthly Dose of News and the Latest Developments in AI for Peace', accessed 26 February 2025, https://shoutout.wix.com/so/66NnaWJan?languageTag=en.

12 Aung et al., 'Using Satellite Data and Machine Learning to Study Conflict-Induced Environmental and Socioeconomic Destruction in Data-Poor Conflict Areas'.

ability to automate and accelerate data analysis ensures that evidence is gathered and preserved in a timely manner, which is crucial in volatile conflict environments where conditions can change rapidly.

Blockchain offers a decentralised and immutable ledger system that ensures the integrity and authenticity of evidence. By recording data on a blockchain, it becomes nearly impossible to alter or delete information without detection, providing a reliable chain of custody for digital evidence. This technology is particularly valuable in legal contexts where the authenticity of evidence is paramount. During the Afghan refugee crisis, blockchain technology was employed to document and verify the testimonies of Afghan refugees. By storing these testimonies on a blockchain, human rights organizations have ensured that the records are tamper-proof and can be used to support international legal actions against perpetrators. However, as Duffield argues in Post-Humanitarianism: Governing Precarity in the Digital World, connectivity and digital tools often introduce new forms of cognitive subordination and automated management rather than fully addressing systemic challenges in conflict zones.[13] These technologies may inadvertently encourage acceptance of precarious conditions rather than fostering long-term solutions to underlying crises.

New digital technologies have radically altered how humanitarian actors identify, prevent, and resolve conflicts and disasters.[14] Blockchain can also be used to store digital forensics data and other critical information, ensuring that this data remains unaltered from the point of collection through to its use in court.[15]

B. Challenges and Limitations

AI and blockchain technologies, while promising evidence integrity, face significant challenges. AI systems require extensive datasets and robust infrastructure, which may be inadequate or nonexistent in conflict zones. Moreover, AI algorithms can exhibit biases and errors, potentially leading to incorrect interpretations of data, thereby impacting the reliability of evidence gathered.[16] Such biases are particularly problematic in culturally diverse settings like Afghanistan, where algorithms designed in foreign contexts may fail to account for local linguistic, cultural, and socio-political nuances.

Also, Implementing AI and blockchain technologies in conflict zones such as Afghanistan is hindered by severe access barriers. These include limited electricity due to infrastructure damage and inconsistent internet connectivity amid ongoing conflict. Local stakeholders, including NGOs and humanitarian organizations operating in Afghanistan, often lack the technical expertise needed to effectively deploy and utilise these complex tools, further complicating their implementation.[17] Tailored solutions must be developed to accommodate the challenging local context in Afghanistan

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13 Mark Duffield, *Post-Humanitarianism: Governing Precarity in the Digital World* (John Wiley & Sons, 2018).

14 Fejerskov, *The Global Lab*.

15 Asma Jodeiri Akbarfam et al., 'ForensiBlock: A Provenance-Driven Blockchain Framework for Data Forensics and Auditability' (arXiv, 7 August 2023), https://doi.org/10.48550/arXiv.2308.03927.

16 Bias in Algorithms - Artificial Intelligence and Discrimination | European Union Agency for Fundamental Rights (Staging)', accessed 6 March 2025, https://staging.fra.europa.eu/en/publication/2023/bias-algorithms-artificial-intelligence-and-discrimination.

17 Saman Rejali and Yannick Heiniger, 'The Role of Digital Technologies in Humanitarian Law, Policy and Action: Charting a Path Forward', *International Review of the Red Cross* 102, no. 913 (April 2020): 1–22, https://doi.org/10.1017/S1816383121000114.

and empower users with the necessary skills amidst these adversities. Without capacity-building initiatives tailored to the local Afghan context, the deployment of AI and blockchain risks further marginalising communities rather than empowering them. Partnerships with international organizations and technology firms could play a vital role in bridging this technical gap.

The use of AI and blockchain for human rights documentation also raises significant ethical concerns, particularly in terms of data privacy and security. As highlighted by Roche, Wall, and Lewis, ensuring privacy, transparency, and accountability in AI deployments is essential to prevent misuse and maintain the trust of affected populations.[18] In conflict settings like Afghanistan, where sensitive information about vulnerable populations and witnesses is often at stake, the potential for data breaches or misuse by malicious actors poses significant threats to individual safety and rights. For instance, if data stored on a blockchain is accessed or manipulated by armed groups, it could be used to target individuals or communities, further exacerbating the risks faced by those already vulnerable.

In a conflict setting like Afghanistan, where sensitive information about vulnerable populations is at risk, there is an increased potential for misuse by malicious actors, posing significant threats to individuals' safety and rights. Ensuring the protection of data integrity and confidentiality is essential to build and maintain trust within communities affected by conflict. Grimm, Grossman, Gless, and Hildebrandt discuss the complexities surrounding AI's role in judicial proceedings, highlighting the ethical and practical challenges faced when integrating artificial intelligence into courtroom practices.[19]

In Afghanistan, the admissibility of AI and blockchain-derived evidence in international courts faces intricate legal challenges amid the country's evolving political landscape.[20] Variations in legal standards across different regions of Afghanistan further complicate the acceptance and authentication of digital evidence in legal proceedings. Establishing standardised frameworks that are sensitive to the local Afghan context is crucial for ensuring the credibility and admissibility of evidence gathered through these technologies.

CONTRIBUTIONS OF INTERNATIONAL BODIES AND NGOS IN DOCUMENTATION AND ADVOCACY

International organizations and NGOs play a critical role in documenting human rights abuses and advocating for victims, often working in tandem to maximise their impact. Many self-professed "human rights organizations" primarily focus on civil and political rights, including well-known entities like Amnesty International and Human Rights Watch. However, numerous NGOs address broader issues like poverty, violence, racism, health, homelessness, and environmental concerns, totalling hundreds of thousands worldwide.[21] Afghanistan, with its prolonged conflict and human rights challenges, provides a clear example of how international organizations and NGOs collaborate to document abuses, advocate for victims, and support the rule of law.

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18 Cathy Roche, P. J. Wall, and Dave Lewis, 'Ethics and Diversity in Artificial Intelligence Policies, Strategies and Initiatives', *AI and Ethics* 3, no. 4 (1 November 2023): 1095–1115, https://doi.org/10.1007/s43681-022-00218-9.

19 Paul W Grimm et al., 'Artificial Justice: The Quandary of AI in the Courtroom', 2022.

20 Annual Report 2022 | ICRC', 29 June 2023, https://www.icrc.org/en/document/annual-report-2022.

21 Human Rights Activism and the Role of NGOs - Manual for Human Rights Education with Young People', accessed 26 February 2025, https://www.coe.int/en/web/compass/human-rights-activism-and-the-role-of-ngos.

A. Documentation and Monitoring

NGOs like Amnesty International and Human Rights Watch are at the forefront of monitoring and documenting human rights abuses globally. They collect evidence, report on violations, and maintain databases that are crucial for international awareness and action. These organizations use a variety of methods including field research, witness interviews, and satellite imagery to gather comprehensive data on human rights abuses.[22] The United Nations (UN), through bodies like the Office of the High Commissioner for Human Rights (OHCHR), collaborates with NGOs to document violations and publish reports that highlight areas of concern. The UN's consultative status arrangement allows NGOs to present their findings directly to the Economic and Social Council (ECOSOC), ensuring that their data influences international policies and responses.[23]

In Afghanistan, Human Rights Watch (HRW) has extensively documented abuses, including violations by armed groups and Afghan government forces. Their detailed reports often highlight specific incidents, such as attacks on civilians, which are critical for international awareness and advocacy.[24] Amnesty International has also played a pivotal role in documenting human rights abuses in Afghanistan. They have produced reports on issues ranging from violence against women to arbitrary detention and torture. These reports are used to advocate for change both within Afghanistan and in the international community.[25]

The United Nations Assistance Mission in Afghanistan (UNAMA) systematically monitors and reports on the human rights situation in Afghanistan. Their periodic reports provide a comprehensive overview of the human rights landscape, documenting violations by all parties involved in the conflict. This information is crucial for informing UN resolutions and international policy decisions.[26]

Humanitarians are required to operate with impartiality, independence, and professional competence, focusing solely on preventing and alleviating human suffering. The combined efforts of NGOs and UN bodies not only create a comprehensive record of human rights abuses for accountability but also establish a foundation for long-term policy interventions and capacity-building initiatives to strengthen Afghanistan's human rights framework. As Slim emphasises in Humanitarian Ethics: A Guide to the Morality of Aid in War and Disaster, navigating the ethical complexities of engaging with warring parties or questionable regimes often demands a principled yet pragmatic approach to ensure that humanitarian efforts remain effective and ethically sound.[27]

B. Advocacy and Policy Influence:

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22 Human Rights Careers, '25 International Human Rights Organizations', Human Rights Careers, 13 October 2019, https://www.humanrightscareers.com/magazine/international-human-rights-organizations/.

23 NGO Participation in the Human Rights Council', OHCHR, accessed 26 February 2025, https://www.ohchr.org/en/hr-bodies/hrc/ngo-participation.

24 Human Rights Watch, 'Afghanistan'.

25 The State of the World's Human Rights: April 2024', Amnesty International, 23 April 2024, https://www.amnesty.org/en/documents/pol10/7200/2024/en/.

26 Human Rights Situation in Afghanistan, n.d.

27 Hugo Slim, *Humanitarian Ethics: A Guide to the Morality of Aid in War and Disaster* (Oxford University Press, 2015).

NGOs often lobby governments and international bodies to enact policy changes. They launch campaigns, organise protests, and engage in strategic litigation to hold perpetrators accountable and push for systemic reforms.[28] For example, Amnesty International has successfully lobbied for changes in laws and policies in various countries to protect human rights. International organizations like the UN also advocate for human rights through their mechanisms and special procedures. They work on creating international treaties and frameworks that member states are encouraged to adopt and implement. The combined advocacy efforts of NGOs and international organizations can lead to significant policy shifts and enhanced protections for vulnerable populations.[29]

NGOs and international organizations have successfully lobbied for policy changes in Afghanistan. For instance, advocacy by human rights organizations contributed to the establishment of the Afghanistan Independent Human Rights Commission (AIHRC), which works to monitor and protect human rights within the country. International bodies like the United Nations have used their platforms to bring attention to human rights issues in Afghanistan. For example, the UN has passed resolutions calling for the protection of women's rights and urging the Afghan government to take stronger actions against human rights violations.[30]

Sustained advocacy by these organizations remains critical, especially in the context of Afghanistan's evolving political and social landscape, to ensure that human rights violations are addressed and that vulnerable populations receive the protection and justice they deserve.

C. Providing Direct Support and Assistance

Many NGOs provide direct aid to victims of human rights abuses, including legal assistance, medical care, and psychological support. Organizations such as Doctors Without Borders (Médecins Sans Frontières) offer critical medical services in conflict zones, while others provide shelter and rehabilitative support. International bodies support these efforts by funding NGO initiatives, offering training and capacity-building programs, and facilitating international cooperation. The UN, through agencies like UNHCR (United Nations High Commissioner for Refugees), collaborates with NGOs to provide humanitarian assistance and ensure the protection of refugees and internally displaced persons. Organizations such as Doctors Without Borders (Médecins Sans Frontières) provide essential medical services in conflict zones across Afghanistan, often operating in extremely dangerous conditions to deliver care to those affected by the violence.[31]

D. Raising Awareness and Education

Both NGOs and international organizations engage in extensive public education campaigns to raise awareness about human rights issues. They disseminate information through reports, social media, and educational programs aimed at informing the public and empowering individuals to stand up for their rights. By highlighting cases of abuse and advocating for justice, these organizations help to

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28 Strategic Litigation and Its Untapped Potential for Anti-Corruption', CMI - Chr. Michelsen Institute, accessed 26 February 2025, https://www.cmi.no/publications/9086-strategic-litigation-untapped-potential-for-anti-corruption.

29 Careers, '25 International Human Rights Organizations'.

30 *Ibid.*

31 Afghanistan | Médecins sans Frontières', accessed 26 February 2025, https://www.msf.fr/pays/afghanistan.

generate global awareness and foster a culture of accountability. This, in turn, puts pressure on governments and institutions to address and rectify human rights violations. Such campaigns often adopt a rights-based approach, emphasising the intersection of issues like gender, poverty, and displacement. Effective initiatives prioritise local engagement and culturally relevant materials, empowering marginalised communities to advocate for systemic change.

NGOs in Afghanistan, supported by international organizations, run numerous programs to educate the public about human rights. For instance, Save the Children and War Child conduct educational initiatives aimed at protecting children's rights and ensuring access to education in conflict zones.[32] Awareness campaigns by NGOs like Amnesty International have brought global attention to the plight of Afghan women and girls. These campaigns help to mobilise international support and pressure governments to act.

E. Collaborative Efforts

Collaboration between local and international organizations is vital for effective human rights work. International NGOs often partner with local organizations to leverage their on-the-ground knowledge and networks. This collaboration enhances the effectiveness of monitoring, reporting, and advocacy efforts by ensuring that they are contextually relevant and culturally sensitive.[33]

Scholars highlight that equitable power dynamics and mutual capacity-building are key to effective partnerships between local and international organizations. Hierarchical collaborations risk marginalising local actors and undermining sustainability, while participatory approaches enhance local capacities and ensure interventions align with socio-political and cultural contexts.[34]

In Afghanistan, international NGOs work with local human rights defenders to document abuses and advocate for the protection of human rights. This collaborative approach not only amplifies local voices but also ensures that international efforts are informed by local realities and needs (United for Human Rights). Therefore, the synergy between international organizations and NGOs is essential for the robust documentation of human rights abuses and effective advocacy. Their combined efforts ensure that human rights violations are brought to light, perpetrators are held accountable, and victims receive the support and justice they deserve.[35]

AMPLIFYING MARGINALISED VOICES

A. Traditional vs. Emerging Technologies for Narrative Sharing

Historically, marginalised communities have relied on traditional media such as radio, print journalism, and television to share their narratives. While these platforms have been crucial in raising

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[32] Afghanistan', Save the Children International, 22 December 2024, https://www.savethechildren.net/afghanistan; Four Digits, 'War Child in Afghanistan', War Child Global Website, accessed 26 February 2025, https://www.warchild.net/afghanistan/.

[33] Careers, '25 International Human Rights Organizations'.

[34] Bonny Ibhawoh, *Human Rights in Africa* (Cambridge University Press, 2018).

[35] International Federation for Human Rights', International Federation for Human Rights, accessed 26 February 2025, https://www.fidh.org/en/about-us/What-is-FIDH/.

awareness, they often have limitations in reach and engagement. Traditional media can be controlled by state actors or influenced by political agendas, which may result in censorship or biased representation of marginalised voices. As McChesney argued, "Media reform will not, cannot, be won in isolation from broader democratic reform. The only way to wrestle some control over media and communication from the giant firms that presently dominate the field will be to mobilise some semblance of a popular movement".[36] This underscores the necessity of a collective effort to democratise media spaces and ensure that marginalised voices are accurately and fairly represented.

The advent of digital platforms, social media, and innovative technologies has revolutionised how marginalised communities share their stories. Social media platforms like Twitter, Facebook, and Instagram allow for real-time sharing and wider dissemination of narratives without the gatekeeping typically associated with traditional media. Additionally, platforms like YouTube and podcasts enable marginalised voices to create and control their content, reaching a global audience.

According to Bailenson, emerging technologies like virtual reality (VR) and immersive storytelling offer deeply engaging and personal experiences that surpass the capabilities of traditional media.[37]

B. Impact of Virtual Reality and Immersive Storytelling on Marginalised Communities

Virtual Reality (VR)[38] technology immerses users in simulated environments, offering an empathetic and impactful way to experience the realities faced by marginalised communities. Collaborative virtual environments (CVEs) hold the immense potential of enhancing social inclusion and social support not only in younger but especially also in older people.[39] These environments leverage technology to facilitate interpersonal interactions and shared experiences, which can mitigate feelings of isolation and promote a sense of community across different age groups.

By creating immersive experiences, VR vividly conveys the harsh conditions and personal stories from conflict zones in a manner far more visceral than traditional media. For instance, VR documentaries have effectively highlighted the experiences of refugees, providing viewers a first-person perspective on their struggles, resilience, and daily challenges. This approach is particularly powerful in contexts like Afghanistan, where VR has been used to document the lives of internally displaced persons (IDPs) and refugees, showcasing their experiences in a way that transcends traditional media. Viewers can immerse themselves in the daily struggles and resilience of Afghan refugees, gaining insights into the complexities of displacement and conflict.

Immersive storytelling, which integrates video, audio, and interactive graphics, further enhances these narratives. Platforms like 360-degree videos and augmented reality (AR) apps transport audiences directly to conflict zones, enabling them to witness events and hear stories directly from those

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36 Robert W. McChesney, *Rich Media, Poor Democracy: Communication Politics in Dubious Times* (New Press, The, 2016).

37 Jeremy Bailenson, *Experience on Demand: What Virtual Reality Is, How It Works, and What It Can Do* (W. W. Norton & Company, 2018).

38 VR for Good | Virtual Reality Storytelling Focused on Social Impact | Meta', accessed 26 February 2025, https://about.meta.com/community/vr-for-good/?utm_source=www.oculus.com&utm_medium=redirect.

39 Anna Felnhofer et al., 'Physical and Social Presence in Collaborative Virtual Environments: Exploring Age and Gender Differences with Respect to Empathy', *Computers in Human Behavior* 31 (1 February 2014): 272–79, https://doi.org/10.1016/j.chb.2013.10.045.

affected. This immersive engagement fosters deeper understanding and emotional connection with marginalised communities, crucial for cultivating empathy and support for humanitarian causes.[40]

C. Case Studies from Conflict Zones

In Afghanistan, various digital platforms and technologies have been employed to amplify the voices of those affected by conflict. For instance, the project "VR for Good" has produced VR documentaries highlighting the experiences of Afghanistan, allowing global audiences to experience their daily lives and challenges.

This use of technology parallels Professor Rizzo's pioneering work in virtual reality (VR) exposure therapy for combat-related PTSD, including projects like Virtual Iraq/Afghanistan, which have advanced PTSD assessment and stress resilience strategies since 2004. Additionally, Rizzo's USC MedVR Lab has developed VR game-based applications to aid physical and cognitive rehabilitation in individuals with central nervous system (CNS) dysfunctions such as stroke and traumatic brain injury.[41]

Moreover, mobile technology has empowered Afghan journalists and activists to document and disseminate real-time footage of human rights abuses, reaching international advocacy groups and amplifying their impact.

Syria: In Syria, the "Project Syria"[42] VR experience created by the University of Southern California immerses users in the experiences of Syrian children affected by the conflict. By virtually placing users in a Syrian street during a bombing, the project aims to foster empathy and raise awareness about the Syrian crisis.

At the 2014 World Economic Forum in Davos, Switzerland, Nonny de la Peña, a Ph.D. candidate in Media Arts + Practice at the University of Southern California, presented Project Syria, an innovative immersive journalism piece that transforms a YouTube clip of an attack in Aleppo into a virtual reality experience. This groundbreaking project allows participants to feel as if they are on the streets of Aleppo, evoking powerful emotional responses and drawing attention to the suffering caused by the Syrian conflict. De la Peña emphasised the urgency of raising awareness about the plight of Syrians and expressed hope that immersive journalism could inspire global action. Her work exemplifies the interdisciplinary focus of the Media Arts + Practice program, which combines scholarly research with creative media to address complex global issues. Dean Elizabeth M. Daley and Chair Holly Willis praised De la Peña's contributions, highlighting the potential of immersive storytelling to make distant crises more tangible, reimagining fields such as journalism, activism, and democracy. Project Syria demonstrate the transformative potential of virtual reality in fostering empathy and driving awareness of humanitarian crises.

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40 James J Cummings et al., 'Effects of Immersive Storytelling on Affective, Cognitive, and Associative Empathy: The Mediating Role of Presence', *New Media & Society* 24, no. 9 (1 September 2022): 2003–26, https://doi.org/10.1177/1461444820986816.

41 Albert Rizzo et al., 'Virtual Reality Applications for the Assessment and Treatment of PTSD', in *Handbook of Military Psychology: Clinical and Organizational Practice*, ed. Stephen V. Bowles and Paul T. Bartone (Cham: Springer International Publishing, 2017), 453–71, https://doi.org/10.1007/978-3-319-66192-6_27.

42 For more information please kindly check: https://cinema.usc.edu/news/article.cfm?id=14051&utm.

Rohingya Crisis: The "I Am Rohingya"[43] VR project provides an immersive experience of the lives of Rohingya refugees in Bangladesh. By using VR, the project aims to bring global attention to the situation of the Rohingya people, helping to humanise their struggles and mobilise international support. Released amidst escalating violence in Myanmar's Rakhine State, the documentary captures the resilience of refugees and the dire conditions in the camps. The documentary is part of a series aiming to amplify voices from communities impacted by conflict and inequality.

REAL-WORLD IMPLICATIONS: THE AFGHANISTAN CASE STUDY

The uses of mobile phones, social media platforms, geospatial technologies, and various forms of crowdsourcing have fundamentally altered how humanitarian crises are detected and addressed, as well as how information is collected, analysed, and disseminated. Biometric identification technologies are increasingly employed as tools for emergency support and refugee management. These technological advancements are widely recognised by policymakers and scholarly contributions alike, as they expand the possibilities for prevention, response, and resource mobilization for humanitarian actors and affected communities.[44]

In Afghanistan, the deployment of advanced technologies has been pivotal in addressing humanitarian challenges and documenting human rights abuses amidst ongoing conflict. These technologies have enabled more efficient aid distribution, improved communication among stakeholders, and enhanced monitoring capabilities in volatile regions.

Satellite imagery and unmanned aerial vehicles (UAVs or drones) have revolutionised the monitoring and assessment of conflict zones in Afghanistan. Organizations like the United Nations Institute for Training and Research (UNITAR) utilise satellite data to monitor humanitarian crises, assess damage to infrastructure, and identify displaced populations.[45] Drones, on the other hand, provide real-time visual intelligence, aiding in surveillance and disaster response efforts.

Mobile phones and applications have empowered Afghan civilians, activists, and humanitarian workers with tools for real-time reporting and communication. Blockchain technology has introduced transparency and efficiency into humanitarian aid distribution efforts in Afghanistan. Organizations utilise blockchain to trace the flow of funds and resources, ensuring that aid reaches its intended recipients without intermediaries or corruption [46] This technology enhances accountability and trust in humanitarian operations, vital in contexts where accountability and transparency are often challenged by political instability and conflict dynamics.

A case study from the Maiwand district of Kandahar highlights the transformative potential of digital financial platforms in humanitarian aid. The Norwegian Refugee Council (NRC), in partnership with

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43 For more information please kindly check: I Am Rohingya - AJ Contrast.

44 Kristin Bergtora Sandvik et al., 'Humanitarian Technology: A Critical Research Agenda', *International Review of the Red Cross* 96, no. 893 (March 2014): 219–42, https://doi.org/10.1017/S1816383114000344.

45 UNOSAT Emergency Mapping Service-MTE Report.Pdf', accessed 26 February 2025, https://unitar.org/sites/default/files/media/file/UNOSAT%20Emergency%20Mapping%20service-MTE%20report.pdf.

46 UnBlocked Cash Project: Using Blockchain Technology to Revolutionize Humanitarian Aid', Oxfam International, 13 February 2024, https://www.oxfam.org/en/unblocked-cash-project-using-blockchain-technology-revolutionize-humanitarian-aid.

Hesab Pay, piloted an e-cash program from October to December 2023, providing USD 170 per month to 110 vulnerable households, including women and elderly-headed families. The e-cash system enabled participants to purchase essential goods like food and household supplies securely, eliminating the risks associated with carrying physical cash. Participants. The project also fostered digital literacy among participants, enhanced market efficiency for rural retailers, and expanded the reach of electronic financial service providers. This case illustrates how advanced technologies like digital financial platforms can improve aid delivery and build resilience in conflict-affected communities.[47]

Similarly, a study in Afghanistan leveraged mobile phone data and machine learning to improve the targeting of anti-poverty programs under the Targeting the Ultra-Poor (TUP) initiative. By analysing call detail records (CDR), researchers demonstrated that CDR-based targeting was nearly as accurate as traditional methods and more efficient when combined with conventional measures. These technologies enabled rapid and cost-effective identification of households most in need, overcoming challenges posed by Afghanistan's conflict-affected and resource-limited context.[48]

However, addressing ethical concerns, such as data privacy and inclusivity for non-phone users, remains essential. Together, these cases illustrate how emerging technologies can amplify marginalised voices and enhance the precision of humanitarian responses in conflict zones.

EXAMINATION OF CHALLENGES

The deployment of digital and advanced technologies in conflict zones like Afghanistan has the potential to significantly improve humanitarian efforts, documentation of human rights abuses, and overall response coordination. However, several challenges hinder the effective implementation of these technologies. This section delves into the infrastructure limitations, security risks, and cultural and language barriers that must be addressed to leverage technology successfully in such contexts.

A. Infrastructure Limitations

One of the primary challenges in deploying technology in Afghanistan is the lack of reliable infrastructure, which significantly hampers efforts to utilise advanced technologies for humanitarian operations. Many areas suffer from frequent power outages, limited internet access, and damaged communication networks, creating substantial obstacles for sustainable technological deployment. Reliable electricity, a foundational requirement for most technologies, remains scarce in Afghanistan. According to the World Bank,[49] nly about 35% of the population has access to electricity, and even this access is often erratic and unreliable. This limitation makes it difficult to operate servers, mobile

[47] For more information please kindly check: https://www.nrc.no/news/2024/february/digital-cash-empowering-rural-communities-in-southern-afghanistan/.

[48] Emily Aiken et al., 'Program Targeting with Machine Learning and Mobile Phone Data: Evidence from an Anti-Poverty Intervention in Afghanistan' (arXiv, 22 June 2022), https://doi.org/10.48550/arXiv.2206.11400.

[49] Afghanistan | Data, accessed 6 March 2025, https://data.worldbank.org/country/afghanistan?utm_source=chatgpt.com.

devices, and other electronic equipment necessary for communication, documentation, and coordination in humanitarian efforts.

Internet connectivity presents another significant challenge. Despite efforts to expand digital infrastructure, Afghanistan's internet penetration remains low, particularly in rural areas. The Afghanistan Telecom Regulatory Authority (ATRA) reported in 2019 that internet penetration was only about 22%, reflecting the limited reach of digital services in much of the country. Without consistent and widespread internet access, deploying digital platforms and real-time communication tools becomes impractical, hindering efforts to document human rights abuses, coordinate humanitarian responses, and deliver vital services. The lack of reliable connectivity also isolates many communities from receiving timely assistance and participating in broader advocacy efforts.

Adding to these challenges is the destruction of communication networks caused by ongoing conflict. The World Bank[50] highlights that telecommunication towers and other critical infrastructure have been frequently targeted or destroyed during military operations. These damages not only disrupt communication but also require significant resources and logistical coordination for repairs, which are often delayed due to insecurity in conflict zones. Together, these infrastructure limitations severely restrict the deployment of technology in Afghanistan, underscoring the need for investments in stable energy systems, internet expansion, and the protection of physical infrastructure to enable the effective use of technology in humanitarian and human rights efforts.

B. Security Risks

The use of technology in conflict zones like Afghanistan presents significant security risks that threaten both infrastructure and the people relying on it for communication, documentation, and coordination. The overwhelming influx of information during crises, known as Big Data—generated from sources like social media and satellite imagery—can be both a tool and a challenge. As Meier highlights in *Digital Humanitarians: How Big Data Is Changing the Face of Humanitarian Response*, this data deluge can paralyse traditional humanitarian organizations, making them reliant on digital experts to manage and secure this information effectively. [51] Additionally, malicious actors, including authoritarian regimes, may exploit digital tools to access sensitive information, placing refugees, human rights defenders, and aid workers at severe risk. Cyberattacks such as hacking, ransomware, and data breaches further jeopardise the safety and effectiveness of humanitarian operations.

Improper handling or exposure of sensitive data in humanitarian contexts can exacerbate these risks. According to Slim, sensitive information, if mishandled, can inadvertently put individuals at risk of persecution or violence.[52] In conflict zones like Afghanistan, where digital infrastructure is already limited, the lack of robust cybersecurity protocols makes it easier for bad actors to intercept communications or compromise systems. This vulnerability undermines the documentation of human rights abuses and the coordination of humanitarian relief, impeding efforts to address violations effectively. The absence of proper data protection protocols can erode trust in technology and hinder the adoption of innovative tools in these fragile environments.

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50 Afghanistan | Data.

51 Patrick Meier, *Digital Humanitarians: How Big Data Is Changing the Face of Humanitarian Response* (CRC Press, 2015).

52 Slim, *Humanitarian Ethics*.

Technological assets, such as drones and satellite imagery, also face significant security challenges as they become targets for hostile groups. Drones are particularly vulnerable to being shot down or hijacked, while satellite data can be intercepted or misused for malicious purposes. Armed groups have been known to attack communication towers and other critical technological infrastructure to disrupt communication and coordination among humanitarian actors and government forces.[53] These attacks not only compromise the operational effectiveness of humanitarian missions but also heighten the risks faced by civilians relying on these services.

The interception of communication remains another pressing concern in conflict zones. While secure communication platforms are essential to protect sensitive information, even encrypted communication can fall victim to sophisticated cyberattacks. Intercepted communications can expose the locations and plans of humanitarian workers, putting their lives at significant risk. According to the Humanitarian Policy Group (HPG) at ODI, there have been documented instances where intercepted communications led to targeted attacks on humanitarian convoys and personnel.[54] These risks highlight the urgent need for robust security measures, including advanced encryption technologies and comprehensive cybersecurity training for humanitarian actors working in conflict zones.

C. Cultural and Language Barriers

Successfully implementing technology in Afghanistan requires addressing the significant cultural and language barriers that can hinder its adoption and effectiveness. Afghanistan is a linguistically diverse country with Dari and Pashto as its official languages, along with several regional languages spoken across the nation. To make technology accessible, it must be adapted not only to local languages but also to the cultural context in which it is deployed. This goes beyond simple translation to include designing user interfaces and experiences that resonate culturally and are intuitive for local users. Toyama emphasised that technology projects often face low adoption rates when they fail to account for such local nuances. This observation holds particularly true in Afghanistan, where tailored solutions are essential for widespread adoption and meaningful impact.[55]

Cultural norms and practices also play a crucial role in determining how technology is perceived and used in Afghanistan. For example, gender norms can significantly influence women's access to and usage of technology. In many parts of the country, women face cultural and familial restrictions that limit their ability to use mobile phones or access the internet. According to GSMA, women in Afghanistan are 50% less likely than men to use mobile internet, which highlights the importance of adopting culturally sensitive approaches to technology deployment. Addressing these disparities requires engaging with communities to design solutions that account for local practices, such as

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53 Human_rights_situation_in_afghanistan_jul-Sep_2023.Pdf', accessed 26 February 2025, https://unama.unmissions.org/sites/default/files/human_rights_situation_in_afghanistan_jul-sep_2023.pdf.

54 Humanitarian Policy Group at ODI Global | ODI: Think Change, accessed 6 March 2025, https://odi.org/en/about/our-work/humanitarian-policy-group/.

55 Kentaro Toyama, 'Geek Heresy: Rescuing Social Change from the Cult of Technology', *Innovations in Teaching & Learning Conference Proceedings* 9 (6 June 2017), https://doi.org/10.13021/G8itlcp.9.2017.1853.

creating safe spaces for women to access technology or developing educational initiatives that advocate for gender equity in digital access.[56]

Marc Prensky's concept of "digital natives" provides additional insights into how technology can be made more effective when adapted to its audience. Prensky asserted that younger generations, immersed in digital devices from birth, process information differently from their digital-immigrant predecessors. He advocated for teaching these "digital natives" in their native digital language, suggesting that even serious content can be effectively taught through methods such as computer games.[57] This principle is applicable to Afghanistan, where younger populations, if provided with culturally and linguistically relevant tools, could significantly contribute to the broader adoption of technology. Addressing both cultural and language barriers is essential for ensuring that technological advancements are inclusive and impactful in Afghanistan's unique socio-cultural landscape.

LESSONS LEARNED AND RECOMMENDATIONS

This section highlights key insights gained from the analysis and provides actionable recommendations to address challenges in technology deployment. These lessons emphasise the importance of infrastructure, security, cultural adaptation, training, and collaboration to ensure the successful and sustainable implementation of technological solutions in challenging environments, as follows:

1. Invest in Infrastructure Development: Overcoming infrastructure limitations requires significant investment in building and maintaining robust communication networks and reliable power sources. Deploying renewable energy solutions, such as solar power, can provide a stable electricity supply in remote or conflict-affected areas. Partnering with international organizations and private sector companies is essential to fund and implement these critical infrastructure projects effectively.
2. Enhance Security Measures: Mitigating security risks demands the implementation of advanced security protocols for all technological deployments. This includes using end-to-end encryption for communication platforms, securing data transmission from drones and satellites, and training users on cybersecurity best practices. Collaboration with cybersecurity experts and ongoing monitoring of threats are crucial to ensuring the safety and integrity of these technologies.
3. Adapt Technology to Local Contexts: For technology deployment to be effective, it must be customised to fit cultural and linguistic contexts. This involves developing localised versions of apps and technologies, offering training in local languages, and engaging community leaders to foster acceptance and adoption. Gender-sensitive approaches are particularly important to ensure that women have equal access to these technologies.
4. Provide Continuous Training and Capacity Building: Training local stakeholders in the use and maintenance of new technologies is essential. Comprehensive training programs should be provided for journalists, activists, and humanitarian workers to help them effectively utilise tools such as mobile apps, blockchain, and secure communication platforms. Ongoing capacity

[56] GSMA | Gender Gap 2020 - Mobile for Development', accessed 26 February 2025, https://www.gsma.com/r/gender-gap-2020/.

[57] Kentaro Toyama, 'Geek Heresy: Rescuing Social Change from the Cult of Technology', *Innovations in Teaching & Learning Conference Proceedings* 9 (6 June 2017), https://doi.org/10.13021/G8itlcp.9.2017.1853.

building ensures that local communities can sustain these technologies and adapt them to evolving needs.

5. Promote Collaborative Approaches: Effective technology deployment in conflict zones requires collaboration among diverse stakeholders, including government agencies, international organizations, NGOs, and local communities. By pooling resources, sharing expertise, and ensuring alignment with local needs, collaborative approaches can significantly enhance the success and sustainability of these efforts.

CONCLUSION

Technological advancements like artificial intelligence, blockchain, and digital forensics have significantly improved the documentation of human rights abuses, ensuring the integrity of evidence for legal and advocacy efforts. Technologies such as virtual reality and immersive storytelling are empowering marginalised communities to share their narratives, enhancing public empathy and awareness. Additionally, secure communication channels like mesh networks and satellite systems are crucial for maintaining the flow of information, facilitating swift and effective coordination among humanitarian actors in crisis situations. The Afghanistan case study underscores the potential of satellite imagery and blockchain for aid distribution but also highlights the need for context-specific and culturally sensitive solutions to address infrastructure limitations and security concerns.

Looking forward, emerging technologies like AI, blockchain, VR, and the Internet of Things (IoT) hold significant potential to further strengthen human rights protection in conflict zones. However, their effective deployment requires strategic planning, localised implementation, and a nuanced understanding of the socio-political landscapes in which they are applied. Collaborative efforts among stakeholders and capacity-building initiatives are essential to sustain the impact of these technological interventions. Policymakers must also develop robust regulatory frameworks to protect digital rights and ensure ethical technology use, prioritising long-term sustainability. By leveraging innovative technologies, fostering inclusive partnerships, and upholding ethical standards, we can drive meaningful progress in human rights advocacy and humanitarian efforts amidst the complexities of conflict and adversity. These combined efforts must also aim to bridge the digital divide, ensuring equitable access to technology for the most vulnerable populations in conflict zones.

ACKNOWLEDGMENTS

The author would like to extend his heartfelt thanks to the two reviewers and the Editorial Board of Human Rights in the Global South for their insightful comments on this article.

COMPETING INTEREST

The author declares no conflicts of interest related to this study.

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