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DIGITAL TRANSFORMATION AND THE HUMANITARIAN-DEVELOPMENT TRANSITION

The Role of Digital Public Infrastructure and Data Protection

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Introduction

The humanitarian system has made commitments in the Grand Bargain to strengthen the transition in the humanitarian-development nexus from humanitarian aid to longer-term, locally-led responses – including through a greater role for host States in the provision of relief and services. While the emphasis on this transition has grown – particularly in the context of a severe decline in humanitarian aid – the role of digital technologies, systems, and data in this transition has not received the attention it needs.

Humanitarian response is increasingly digital, with systems transforming and digital cash serving as a significant part of that response. However, despite this increasingly digital and data-oriented form of humanitarian response, the implications of digitalisation have not received significant attention in debates about the transition of humanitarian aid and services. In the face of increasing demands for efficiencies, integration, and transformation, this chapter examines how one approach to the digital transformation of service delivery may offer opportunities, while also highlighting the underlying challenges in the transition between humanitarian and longer-term, locally-led development responses.

Digital public infrastructure (DPI) is an approach to digital transformation that promises efficiency savings and a more joined-up, integrated approach to building the 'digital rails' on which public services are delivered. At its core, DPI is characterised by digital identity, payment and data exchange systems – the core systems that public services as well as humanitarian response depend on. A 'pure' DPI sees singular systems shared across government, enabling a fragmented public sector to achieve efficiencies and innovation through

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greater integration – much as the humanitarian sector is being called upon to do.

Through research conducted with humanitarian stakeholders on more integrated approaches to management information systems (MIS) in humanitarian aid, this chapter suggests that most view efficiency as the main driver of such approaches to transformation. It also highlights the concerns that many raise around the protection of data in such a more integrated approach and explores the implications of integrated systems for the protection of humanitarian principles and 'humanitarian space'. It discusses how the principles and policies that govern data management and protection are rooted in these same commitments. It argues that the exclusive purpose specification of data collected for humanitarian relief both protects humanitarian space and is threatened by the transfer of data to other actors for purposes other than the humanitarian response. The chapter concludes by looking forward in order to explore what a DPI approach would need to consider in order to maintain humanitarian principles and humanitarian space, exploring specific privacy-protective approaches and technologies that can enable the transition of humanitarian aid and relief and yet protect the core principles on which humanitarian response is built.

The Humanitarian to Development Transition

The humanitarian-development nexus represents a conceptual framework aimed at bridging the traditional divide between short-term humanitarian assistance and longer-term development efforts. This nexus has gained significant traction as protracted crises, a competitive funding context, and a growing number of actors who are active in both humanitarian and development work have led to a blurring of the distinction between immediate emergency response and sustainable development work.[1]

The concept of the humanitarian-development nexus emerged from the recognition that the traditional models of humanitarian relief and development, designed for either only short-term responses or longer-term development, were insufficient to address the protracted crises that now account for the majority of humanitarian activity.[2] Although the idea of linking humanitarian relief to broader development has a long history,[3] the 2016 World

1 Atsushi Hanatani, Oscar A. Gómez, and Chigumi Kawaguchi, eds. *Crisis Management Beyond the Humanitarian-Development Nexus* (London: Routledge, 2018), https://doi.org/10.4324/9781351006828.

2 Sonja Hövelmann, "Triple Nexus to Go: Humanitarian Topics Explained," *Berlin: Centre for Humanitarian Action*, 2020, https://www.chaberlin.org/wp-content/uploads/2020/03/2020-03-triple-nexus-to-go-hoevelmann-en.pdf.

3 Hövelmann, "Triple Nexus to Go".

Humanitarian Summit marked a pivotal moment in formalising this approach. One outcome of this was the Grand Bargain, a series of commitments including an emphasis on and commitment to collaborative efforts across the humanitarian, development, and peace sectors. A core goal of these commitments was to move beyond purely reactive emergency responses towards more proactive and sustainable solutions.

The Grand Bargain commitments to strengthening engagement between humanitarian and development actors included a number of specific goals, including shrinking humanitarian needs over the long term with a view to contributing to the achievement of the Sustainable Development Goals. It also included a commitment to increase the preparedness of aid organisations and donors, as well as national governments and the private sector. There were commitments to longer-term, durable solutions, as well as to increase social protection programmes, to strengthen national and local systems, and to establish new partnerships with multilateral development banks and the private sector.[4]

These are ambitious policy goals for transitioning support, financing, and power to local and national actors, including to the States that host recipients of humanitarian relief. The nexus of humanitarian and development activities has led some to identify a transition as a conceptual approach and policy goal of shifting services and support from international humanitarian actors to local humanitarian and development actors, including host States.

The idea of the nexus has historically been described variously as a "bridge",[5] a "continuum",[6] or even a "triple nexus"[7] (incorporating peacebuilding in addition to humanitarian response and development). Within the efforts of the Grand Bargain, the workstream around the nexus began with some momentum, but faced with the sheer scale of the Grand Bargain's scope and ambition, there was concern amongst the signatories that the overall agenda required streamlining, and that the nexus agenda was also already served by other policy processes, including within the Organisation for Economic Co-operation and Development's Development Assistance Committee (OECD-DAC) and in relation to the United Nations (UN) Reform Process and the New Way of Working.

4 International Council of Voluntary Agencies (ICVA), "The Grand Bargain 2.0 Explained – An ICVA Briefing Paper," 2022, accessed 11 June 2025, https://www.icvanetwork.org/resource/the-grand-bargain-2-0-explained-an-icva-briefing-paper-2022/.

5 Alexander Kocks et al., "Building Bridges Between International Humanitarian and Development Responses to Forced Migration," (Stockholm: EBA, 2018), https://nbn-resolving.org/urn:nbn:de:0168-ssoar-58565-6.

6 Joanna Macrae and Adele Harmer, "Beyond the Continuum: An Overview of the Changing Role of Aid Policy in Protracted Crises," *Research Briefing* (London: HPG, 2004), https://media.odi.org/documents/279_GpS59wf.pdf.

7 Hövelmann, "Triple Nexus to Go".

Thus in 2018, the co-conveners took the decision to close the workstream and mainstream the commitments across other workstreams. In 2021, five years after the Grand Bargain was established, signatories reviewed the scope and structures, and established a new 'Grand Bargain 2.0' that focused on two mutually reinforcing 'enabling priorities': quality funding and localisation/participation,[8] with continued commitments to strengthen anticipatory action, financing mechanisms, and the nexus. In 2023, the signatories to the Grand Bargain again reviewed progress and agreed a Grand Bargain 3.0 framework for 2023–2026 that represents a strategic narrowing from the original 51 commitments to a more focused approach, but one that includes 'practical' policy goals[9] around anticipatory action, innovative ways of financing, and the humanitarian-development nexus, which it was hoped would stimulate engagement from actors beyond the humanitarian system.[10] While the role of the nexus has evolved in the Grand Bargain, it has returned as a core theme of the latest round of commitments to aid reform, ensuring its centrality to the way humanitarian assistance is delivered.[11] Yet while the nexus remains a central concept within discussions around humanitarian aid delivery, the term conceals a diversity of perspectives in the way different actors perceive the relationship between the fields of humanitarian and development activity.

Institutional perspectives often frame the nexus primarily as a coordination challenge. The OECD-DAC recommendation on the (triple-)nexus emphasises "complementarity", "coherence", and "collaboration" across humanitarian, development, and peace actors while "respecting humanitarian principles".[12] Similarly, the UN Inter-Agency Standing Committee (IASC) commonly describes the nexus as an opportunity to align planning and programming approaches to achieve "collective outcomes".[13] In other words, for the aid community, particularly donors and multilateral aid organisations, the nexus is framed as a response to changes in the context of crises, the inadequacy of existing international systems, and inefficiency and fragmentation in humanitarian and development response.

8 Victoria Metcalfe-Hough et al., "The Grand Bargain in 2021: an independent review," *ODI*, London, 2021, https://odi.org/en/publications/the-grand-bargain-in-2021-an-independent-review/.

9 Irwin Loy, "Why the Future of Grand Bargain Aid Reforms Hinge on Accountability," *The New Humanitarian*, 15 October 2024, https://www.thenewhumanitarian.org/news/2024/10/15/why-grand-bargain-future-hinges-accountability.

10 Loy, "Why the Future of Grand Bargain Aid Reforms Hinge on Accountability".

11 Active Learning Network for Accountability and Performance (ALNAP), https://alnap.org/help-library/focus-topics/humanitarian-development-peace-nexus/.

12 OECD, "DAC Recommendation on the Humanitarian–Development–Peace Nexus," *OECD*, Paris, 2019, https://legalinstruments.oecd.org/en/instruments/oecd-legal-5019.

13 IASC, "Light Guidance on Collective Outcomes," *IASC*, 2020, https://reliefweb.int/report/world/iasc-policy-light-guidance-collective-outcomes-june-2020.

On the other hand, critics have challenged these framings. Critical scholars have instead suggested that the language of the nexus often represents "old wine in new bottles",[14] reframing enduring challenges such as resource and capacity constraints instead of engaging with structural causes, such as the tensions arising from differences between humanitarian and development mandates. Others argue that the idea of the nexus is driven primarily by the UN and donors,[15] and reflects longstanding donor preferences for integrated approaches rather than any demonstrable benefits.

Yet perhaps the most fundamental tensions at the heart of the nexus are competing ideas about crisis response and international assistance. While some view the nexus as an approach towards strengthening State institutions, others see it as primarily about improving technical coordination that maintains a necessary separation between humanitarian and development activity.[16]

These tensions remain unresolved and will only increase in the face of the most severe funding crises the humanitarian and development sectors have faced.[17] With the United States cutting its humanitarian and development support and other States following suit, and the UN facing a severe financial crisis, there have been and will continue to be extensive cuts to humanitarian response. As a result, humanitarian organisations are retreating from a number of crises, leaving development actors and host States as the default institutional actors. These changes have also come at a time of discussion about a comprehensive agenda of UN system reform which proposes to streamline operations and realign mandates as a direct response to the financial crisis that is squeezing the organisations.[18] This streamlining includes a discussion of merging separate organisations into 'clusters', for example of humanitarian agencies, and a focus on more integrated approaches to the response to essential needs and delivery of services. Whether these lead to a contraction of humanitarian and development aid from the linkages between the two, or increased interest in finding efficiencies through shared systems and services,

14 Dan Gudgeon and Dong Jin Kim. "Old Wine in New Bottles? A Triple Nexus Approach to Linking Aid Cooperation to Peacebuilding on the Korean Peninsula," *International Peacekeeping* 32, no. 1 (2025): 73–97, https://doi.org/10.1080/13533312.2024.2425653.

15 Hövelmann, "Triple Nexus to Go".

16 Hövelmann, "Triple Nexus to Go".

17 International Rescue Committee (IRC), "Global Aid Crisis: 13 Countries Most Affected by International Aid Cuts," accessed 17 June 2025, https://www.rescue.org/13-countries-impacted-aid-cuts.

18 Jordan Ryan, "UN80 and the Reckoning Ahead: Can Structural Reform Deliver Real Change?" *IPI Global Observatory* (blog), 8 May 2025, https://theglobalobservatory.org/2025/05/un80-and-the-reckoning-ahead-can-structural-reform-deliver-real-change/; Erica Harper, "UN Reform: Where to Cut, How to Save, and the Need for Smart Reform," *The New Humanitarian*, 8 May 2025, https://www.thenewhumanitarian.org/opinion/2025/05/08/un-reform-where-cut-how-save-and-need-smart-reform.

the implications for the relationship between humanitarian and development activities will be profound.

The nexus thus represents a critical policy and operational framework for the way humanitarian relief efforts are conceived, designed, and organised, and the way humanitarian services are delivered. This operational vision, and its implications for the transition of service delivery from humanitarian to development and State actors, raises significant challenges in terms of the digital systems and data used to deliver services, and the protections they are afforded.

Digital systems and data are increasingly central to contemporary humanitarian response.[19] They offer the promise of delivering relief in a fast and cost-effective manner, delivering efficiencies and scale – from enabling connectivity, strengthening early warning and needs assessment through the collection and analysis of data, facilitating digital payments, and enabling security in verification through digital biometric technologies' verification of aid recipients for efficiency and security.[20] The ambitions of the Grand Bargain and the nexus, particularly the transition from short-term humanitarian response to longer-term, durable solutions, have significant implications for and dependencies on the enabling digital systems, yet neither the architecture nor protection dimensions of this transition have received the necessary attention.

In this next section, we review debates on the transitioning of aid and services as part of the nexus, and review how digitalisation is transforming this transition. We outline how a particular approach to digital transformation – digital public infrastructure – might offer lessons for the humanitarian-development nexus and the transition of services and aid from short-term humanitarian response to longer-term, durable solutions, especially those provided by state actors.

Service Transition

The transfer and sharing of aid, support, and services from short-term humanitarian response to longer-term solutions, including those provided by development actors such as States, is a particularly contentious aspect of nexus

19 Shirin Madon and Emrys Schoemaker, "Digital Identity as a Platform for Improving Refugee Management," *Information Systems Journal* 31, no. 6 (2021): https://doi.org/10.1111/isj.12353.

20 Barnaby Willitts-King, John Bryant, and Kerrie Holloway, "The humanitarian 'digital divide'," *HPG Working Paper. ODI*, November 2019, https://odi.org/en/publications/the-humanitarian-digital-divide/; Pierrick Devidal, "'Back to Basics' with a Digital Twist: Humanitarian Principles and Dilemmas in the Digital Age," *Humanitarian Law & Policy Blog (blog)*, 2 February 2023, https://blogs.icrc.org/law-and-policy/2023/02/02/back-to-basics-digital-twist-humanitarian-principles/.

approaches. Advocates of linking relief, rehabilitation, and development argue that they can promote sustainability, local ownership, and the progressive realisation of State responsibilities toward citizens[21] – commitments formally established in the Grand Bargain. The World Bank, for example, has explicitly framed humanitarian assistance as a building block for future State services, proposing that "components of humanitarian programming can be gradually adopted by government systems".[22]

Critics of a transfer of services highlight a number of challenges to this ambition. A fundamental challenge is the assumption that States have the willingness and capacity to provide services – an assumption that can be critiqued on both counts. In many contexts, States are party to conflict or exclude particular populations. In Yemen, for example, contested State authority over humanitarian aid relief and social protection systems has complicated the delivery of aid.[23] In these contexts, reliance on State systems may reinforce exclusion, while lack of funding and capacity can lead to the collapse of service provision.[24]

The other significant issue is that the transfer of services raises fundamental questions about humanitarian principles, with humanitarian organisations voicing concerns that alignment with States can compromise humanitarian impartiality, neutrality, and independence. *Médecins Sans Frontières*, for example, has consistently argued that the nexus risks subordinating humanitarian imperatives to ideological goals of liberal development and state-building.[25]

The transfer of data related to the transfer of services raises an existential challenge to humanitarian neutrality. As we will further discuss below, the

21 Irina Mosel and Simon Levine, "Remaking the Case for Linking Relief, Rehabilitation and Development. How LRRD Can Become a Practically Useful Concept for Assistance in Difficult Places," *ODI*, 2014, https://media.odi.org/documents/8882.pdf.

22 Ugo Gentilini, Sarah Laughton and Clare O'Brien, "Human(itarian) Capital?: Lessons on Better Connecting Humanitarian Assistance and Social Protection (English)," Social Protection and Jobs Discussion Paper, no. 1802, Washington, D.C., World Bank Group. http://documents.worldbank.org/curated/en/946401542689917993.

23 Institute of Development Studies, "Sustaining Yemeni Capacities for Social Assistance: Lessons From a Decade of War," *BASIC Research Working Paper 24*, 2024, Accessed 16 June 2025, https://www.ids.ac.uk/publications/sustaining-yemeni-capacities-for-social-assistance-lessons-from-a-decade-of-war/; Achim Wennmann and Fiona Davies. "Economic Dimensions of the Conflict in Yemen," 2020, https://repository.graduateinstitute.ch/record/299800/files/economic-dimensions-conflict-Yemen-october-2020-wennmann-davies-eu-ocha-undp.pdf.

24 Secure Livelihoods Research Consortium (SLRC), "How to support statebuilding, service delivery and recovery in fragile and conflict-affected situations," September 2017, https://securelivelihoods.org/wp-content/uploads/SLRC_briefing_29_V5_web_view.pdf.

25 Jens Pederson, "The Nexus of Peacebuilding, Development and Humanitarianism in Conflict Affected Contexts: A Respect for Boundaries," *MSF Analysis: Reflections on Humanitarian Action (blog)*, 8 January 2021, https://analysis.ocb.msf.org/nexus-peacebuilding-development-humanitarianism-conflict-affected-contexts-respect-boundaries/.

transfer of data collected for humanitarian purposes to support the provision of development support and services threatens the integrity of what is often described as humanitarian space. The transfer of data collected and processed by humanitarian organisations for humanitarian purposes to organisations for the purpose of providing aid, support, or services that are non-humanitarian in nature calls into question the exclusive purpose specification cherished by humanitarians.[26] If data collected by humanitarian organisations for the purpose of providing humanitarian support or services is used for purposes incompatible with this exclusively humanitarian purpose, including, for example, status determination, migration control, counterterrorism, etc., then humanitarian neutrality will be challenged, with highly problematic implications for the continued provision of essential humanitarian services.

Digitalisation of Services

There is a widespread, ongoing digital transformation of the systems and processes used to deliver the services that are at the core of the nexus and transition, with the turn to digital cash transfers serving as a key driver of the broader adoption of digital technologies and transformation.[27] Digital cash transfers were endorsed in the Grand Bargain[28] and have been rapidly adopted as a key element of humanitarian response, with particular support from donors who see this approach as a way of increasing efficiency and transparency in the targeting and enrolment of beneficiaries, in the delivery of assistance, and in providing choice and dignity to affected populations.[29] Digital systems and technologies, such as digital identification and beneficiary management systems such as the World Food Programme's (WFP) SCOPE platform, are able to provide the infrastructure necessary to enable a transition from humanitarian response to longer-term development efforts. Indeed, WFP has described its use of SCOPE in Chad as facilitating "interagency synergies in terms of beneficiary data and transfer management" and as "a platform that can be used to manage resilience building and social welfare initiatives in line with the Chad government's priorities".[30] Despite a number of

26 ICRC, Rules on Personal Data Protection, updated April 2025, https://shop.icrc.org/icrc-rules-on-personal-data-protection-pdf-en.html.

27 Madon and Schoemaker, "Digital Identity as a Platform for Improving Refugee Management".

28 'The Grand Bargain'. n.d., The CALP Network (blog), accessed 17 June 2025, https://www.calpnetwork.org/cash-and-voucher-assistance/policy-and-funding/grand-bargain/.

29 Niklas Rieger et al., "Falling Short? Humanitarian Funding and Reform," *Development Initiatives*, 2024, https://devinit.org/resources/falling-short-humanitarian-funding-reform/.

30 ReliefWeb, "SCOPE: Enabling the Change in WFP Chad (January 2019)," 27 March 2019, https://reliefweb.int/report/chad/scope-enabling-change-wfp-chad-january-2019.

humanitarian organisations – particularly WFP, the UN High Commissioner for Refugees (UNHCR), and the International Organization for Migration (IOM) – offering their platforms for State-led assistance programmes, there remains a pervasive fragmentation of digital systems across the humanitarian sector which creates a significant impediment to this potential.

Current humanitarian digital ecosystems are characterised by a proliferation of siloed management information systems, resulting in duplication of effort, inefficiencies, and inconsistent service delivery. One study of registration systems in Somalia found 13 different digital registration platforms in use by humanitarian organisations, some of which used multiple systems. It also found that organisational policies around registration result in multiple, non-interoperable data systems.[31]

There are both costs and benefits to this siloing of digital technologies and data.

The costs of humanitarian agencies having their own separate systems for registering individuals include forcing people to register multiple times with different organisations and duplicating time and effort to access services and entitlements. As a result, the digital transformation in the humanitarian sector is fragmented and siloed, with vendor lock-in and capacity constraints limiting the sector's ability to align digital transformation with its principles. These challenges are particularly driven by competing institutional interests, proprietary systems, and the absence of common standards or interoperability requirements.[32] In other words, the digital infrastructure on which an increasing amount of humanitarian response relies is characterised by fragmentation, organisational inefficiency, and even programmatic siloes that lead to a duplication of investment in systems, of individuals' time, and varying standards around data management. These problems are, however, not unique to the humanitarian sector – State service delivery has long struggled with siloes, fragmentation, and inconsistent approaches to data management.

The benefit of this siloed approach to digital systems and data processing is that the current architecture of digital infrastructure limits personal data shared by individuals to the systems and processors they have consented to share their data with, and for the purposes they have consented for their data to be used – namely for the purpose of providing humanitarian relief.

31 Boniface Owino, "Harmonising Data Systems for Cash Transfer Programming in Emergencies in Somalia," *Journal of International Humanitarian Action* 5, no. 1 (2020): 11, https://doi.org/10.1186/s41018-020-00077-1.

32 Owino, "Harmonising Data Systems".

Digital Public Infrastructure

The concept of digital public infrastructure (DPI) has emerged as a potential antidote to this fragmentation. DPI encompasses shared digital systems and standards for core services such as identification, payments, and data exchange. It is increasingly seen as a solution to capacity and cost constraints, fragmentation, and vendor lock-in – problems endemic within the humanitarian sector as well as other domains such as the public sector. Several development actors, notably the World Bank's Identification for Development (ID4D) initiative and the Gates Foundation, have embraced this approach.[33] The Digital Public Goods Alliance (DPGA) has also advanced this concept by establishing frameworks for open-source solutions that can be adapted across development contexts.[34]

A DPI approach might help the humanitarian sector to overcome these challenges. DPI reflects a shift from building specific digital systems and services to building the underlying infrastructure – that is, by way of analogy, to optimising the railway network, rather than buying expensive trains. DPI envisions digital infrastructure that is modular, so that individual components can be switched out, and interoperable, so that data can flow seamlessly between those components. A DPI approach could thus play a role in realising the policy goals of the Grand Bargain by facilitating the transition from humanitarian response to social protection, and potentially the other way around if such needs arose in a specific context.

Canonical examples of DPI are India's Aadhaar digital identification system and the 'India Stack', which has been built out from it – the first eKYC (electronic Know Your Customer) services to enable rapid identity verification, then eSign, which enables legal electronic signatures, followed by a UPI (Unified Payment Interface) that enables cashless payments, including through mobile phones, and more recently 'DigiLocker', a platform for the holding and verification of documents and certificates.[35] This collection of digital systems is owned by different ministries and crucially, in terms of enabling innovation, includes different application programming interfaces that allow businesses and others to build new applications on the data, such as

33 World Bank, Julia Clark et al., "Digital Public Infrastructure and Development: A World Bank Group Approach," *Digital Transformation White Paper*, Volume 1. Washington, DC: World Bank, http://hdl.handle.net/10986/42935; Gates Foundation, "What Is Digital Public Infrastructure?" n.d., accessed 12 June 2025, https://www.gatesfoundation.org/ideas/digital-public-infrastructure.

34 DPGA, "DPGs for DPI," https://www.digitalpublicgoods.net/collections/coll-dpi.

35 Cristian Alonso et al., "Stacking up the Benefits: Lessons from India's digital journey," *IMF Working Paper No. 23/78*, Washington D.C., 2023, https://www.imf.org/en/Publications/WP/Issues/2023/03/31/Stacking-up-the-Benefits-Lessons-from-Indias-Digital-Journey-531692.

credit rating and employee referencing. Since its establishment, the Stack has been used to enable core functionality such as personal transactions, government transfers, and services such as health and education, as well as commercial services such as insurance.

The main data governance challenges to this approach to digital transformation include concerns around privacy resulting from the collection, storage, and sharing of personal data, including sensitive biometrics, as well as risks from creating large datasets that may act as honeypots for malicious actors.

In order to assess both the potentialities for and challenges of DPI, particularly from a data protection perspective, it is helpful to review perspectives on the potential of shared infrastructure within the humanitarian sector, as well as between the humanitarian and development sectors. To do so, we draw on earlier research[36] on the feasibility of designing humanitarian aid management information systems to link with social protection systems and to support a transition – in the long term – to State-led social assistance.[37] It is also worth noting the ICRC's interest in the topic, which was one of the focal areas of its 2021 DigitHarium, i.e. digitalised assistance, social protection, and humanitarian data.[38]

Perspectives on Integrated Digital Infrastructure in Humanitarian Contexts

Opportunities for Integrated Information Infrastructure

The most common view held by professionals in the large humanitarian organisations who were interviewed[39] is that the primary value of a more integrated approach to digital infrastructure is increased effectiveness and efficiency. As one UN agency staff member noted, "where data are held in separate and fragmented MIS, there is little opportunity to use these data to recognise trends for more effective planning and response". More integrated data is

36 The original research was conducted in 2021 as part of a UK government (Department for International Development) funded effort to understand the potential for information and identification systems to link humanitarian response and State social protection. The research included a literature review and key informant interviews with a range of stakeholders at a global level as well as case studies involving local literature reviews and in-country interviews in Yemen and South Sudan. Ric Goodman et al., "Review and Analysis of Identification and Registration Systems in Protracted and Recurrent Crises," *BASIC External Briefing Note*, 2020, https://www.calpnetwork.org/wp-content/uploads/ninja-forms/2/BASIC-MIS-in-Crises-2020-Final.pdf.

37 Goodman et al., "Review and Analysis of Identification and Registration Systems".

38 ICRC, "Digitalized Assistance, Social Protection and Humanitarian Data Concerns," *DigitHarium | Month #2*, 9 March 2021, https://www.icrc.org/en/digitharium/digitharium-month-2.

39 Goodman et al., "Review and Analysis of Identification and Registration Systems".

regarded as enabling better identification of patterns and needs across populations. One government donor noted that "larger datasets may also allow organisations to understand where individuals are receiving other benefits to better target or coordinate their response", potentially improving coordination and reducing gaps in assistance.

Many humanitarian professionals identified a reduced burden on beneficiaries as another significant advantage of interoperable systems, offering the potential to lessen registration fatigue for those receiving humanitarian assistance. One staff member of a large NGO noted that "data collected digitally can be immediately referenced with existing data in the information system", meaning individuals may only need to register once to access multiple services.

Others also talked about how more integrated systems within the humanitarian sector could enable easier transitions to government systems – very much in line with the promise of DPI. One technical consultant noted that "transfer to a government-led social protection system would be easiest if data are transferred from a single MIS, or from a centralised data warehouse".

Risks of Integrated Information Systems

Many humanitarian professionals interviewed also flagged the significant privacy and security concerns associated with more integrated systems and transfers of data. One humanitarian technical advisor noted that "single or centralised databases are targets for theft as they are more attractive targets due to the quantity of data". The risks of centralised datasets create additional significant protection concerns. This is particularly the case with humanitarian registration data, which contains sensitive personal information and can put already vulnerable individuals at greater risk. As one staff member from a UN humanitarian agency noted, "the value of personal data (and even more so, biometric data) for identifying individuals of concern to State, law enforcement, security and judicial bodies, is clear". The risk of transferring data collected for humanitarian purposes to States introduces new risks of data misuse by governmental authorities.[40]

More integrated systems can also lead to the combining and further analysis of what were separate datasets. Different humanitarian organisations often collect specific information for specific purposes related to their organisational mandates: UNHCR may collect personal biographic data for refugee status determination, WFP may collect family information as part of needs assessments, and the UN Children's Fund (UNICEF) may collect personal education data as part of eligibility assessment for school access. As one staff

40 Aaron Martin, "Why Sovereignty Matters for Humanitarian Data," *Big Data & Society*, 2025 (forthcoming). https://doi.org/10.1177/20539517251361109.

member of a UN agency providing services in a conflict setting noted, "where MIS share data or in the case of a single MIS with multiple users, there is a potential for mission creep, as increasing amounts of data need to be collected to satisfy different parties and their analytical and service provision needs".[41] This violates the principle of data minimisation (a key data protection concept) and increases risks to already vulnerable populations (contrary to the "do no harm" mantra of humanitarians).

Integrated systems also introduce risks around consent. Many of the humanitarian professionals interviewed highlighted that gaining informed consent was challenging due to the power asymmetries and dire need, echoing insights by other critical observers.[42] One international NGO staff member noted that "whether the responsibility to collect consent is one agency's (single system) or many, the risks with this process in the humanitarian sector are significant".[43] And most information systems do not allow individuals to exercise control or even have oversight of their data and how it is used. One interviewee noted that "many MIS do not afford individuals control over their digital identity and their own data".[44]

DPI and Personal Data Protection in Humanitarian Action

As we have argued elsewhere,[45] DPI approaches for the humanitarian sector must be framed and designed around humanitarian principles and commitments. At the core of all humanitarian actions lie the fundamental principles of humanity, impartiality, neutrality, and independence. These are codified in international humanitarian law, embraced by the United Nations through General Assembly Resolutions 46/182 and 58/114, and incorporated into sector-wide agreements such as the Core Humanitarian Standard on Quality and Accountability and SPHERE Standards.

The promotion of DPI as a contributor to Grand Bargain policy goals and broader humanitarian response requires the reframing and adaptation of DPI to meet these existing humanitarian principles and standards. This means matching the specific technical and operational dimensions of DPI – such as interoperability – against humanitarian policy commitments of protection,

41 Goodman et al., "Review and Analysis of Identification and Registration Systems".

42 Dragana Kaurin, "Data Protection and Digital Agency for Refugees," *Centre for International Governance Innovation*, 2019, https://www.cigionline.org/publications/data-protection-and-digital-agency-refugees/.

43 Goodman et al., "Review and Analysis of Identification and Registration Systems".

44 Goodman et al., "Review and Analysis of Identification and Registration Systems".

45 Rohan Pal et al., "Leveraging the DPI Approach for Multilateral Cooperation in Humanitarian Aid," *T20 Policy Brief*, 2024, https://t20brasil.org/media/documentos/arquivos/TF06_ST_01__Leveraging_the_DPI66faefb580df6.pdf.

consent, and purpose. This can be operationalised through technological design approaches such as "data protection by design" and "privacy by design",[46] and the adaptation of technical and governance dimensions of DPI to meet data protection requirements, the effective enforcement of which will be especially challenging in humanitarian settings.

While these challenges are potentially numerous and will differ according to the specificities of the technological context (digital identification, payments,[47] connectivity, etc.), here we summarise some of the most pressing considerations for humanitarian action. Others have analysed the various privacy and data protection implications of DPI,[48] which we will not rehash here. Instead, we home in on what is uniquely challenging about the potential use of DPI in humanitarian settings.

The handling of personal data by humanitarian organisations based on the promise of exclusively humanitarian use (i.e. purpose specification) is troubled in a scenario in which DPI facilitates the potential repurposing and extended uses of data, many of which may be non-humanitarian in their nature. While the sector has always struggled to ensure through legal and technical means that data collected by humanitarians is used for exclusively humanitarian purposes, the introduction of DPI could serve to make these governance problems even more complex.

Moreover, in situations in which DPI is expected to bridge humanitarian and development spaces, organisations will need to assess whether the legal basis for data processing is adequate. It might be that data collected for a humanitarian response was done so in the vital interest of the data subject. However, the use of this data for other purposes, including development aid and/or by non-humanitarian actors, could require another or an additional legal basis.

Relatedly, there is a real risk that DPI deployed in aid contexts will suffer from unmanageable function creep[49] whereby its purposes and uses expand in an uncontrolled way by dint of the interoperability made possible by the

46 Carmela Troncoso and Wouter Lueks. "Designing for Data Protection," *Handbook on Data Protection in Humanitarian Action*, Massimo Marelli ed., (Cambridge University Press, 2024) 76–95.

47 Pierrick Devidal, "Cashless Cash: Financial Inclusion or Surveillance Humanitarianism?" *Humanitarian Law & Policy Blog*, 2 March 2021, https://blogs.icrc.org/law-and-policy/2021/03/02/cashless-cash/.

48 "Digital Public Infrastructure: Policy Recommendations," 2024. *Access Now* (blog). Accessed 12 June 2025, https://www.accessnow.org/guide/digital-public-infrastructure/; Justin Sherman, "Finding Security in Digital Public Infrastructure," *Atlantic Council* (blog), 21 October 2024, https://www.atlanticcouncil.org/in-depth-research-reports/issue-brief/finding-security-in-digital-public-infrastructure/.

49 Bert-Jaap Koops, "The Concept of Function Creep," *Law, Innovation and Technology* 13, no. 1 (2021): 29–56, https://doi.org/10.1080/17579961.2021.1898299.

underlying infrastructure. These risks are amplified by the governance challenges posed by data processing across the humanitarian, development, and peace sectors, which are often subject to different laws and regulations for data and technology, including international law, and for which oversight and enforcement may vary.

DPI and the Implications for Humanitarian Space

The implications of a DPI approach to digital transformation across the humanitarian-development nexus thus force the question of how to create and protect an exclusively humanitarian digital space.[50] The transition is not just an abstract policy consideration but also one with real implications for people. This space must balance the rights of affected populations and organisations, including preserving the ability of humanitarian actors to operate in line with their principles and squaring the organisational efficiency gains of digital transformation with the protection of humanitarian principles.

This distinction is important because the field of humanitarian action is distinct, governed by specific laws, principles, and practices. The concept of humanitarian space commonly refers to "the ability of agencies to operate freely and meet humanitarian needs in accordance with the principles of humanitarian action".[51] The question then is an enduring one, framed by Sandvik et al. as shifting from thinking about "what technology does *for* humanitarian action to asking what technology does *to* humanitarian action".[52] What then are the specific considerations that a DPI approach to digital transformation in the humanitarian sector raises, particularly in relation to its role in enabling the transition of services from humanitarian to development actors when that transition is possible or required? Secondly, what does a DPI approach do *to* humanitarian action?

In February 2025, in the midst of severe funding cuts, the UN Emergency Coordinator called for a "humanitarian reset" that would include working more closely with partners such as the World Bank and strengthening inter-agency coordination.[53] The continued commitment by the donor and humanitarian policy community to the nexus suggests a persistent view that

50 Daniel Thürer, "Dunant's Pyramid: Thoughts on the 'Humanitarian Space'," *International Review of the Red Cross* 89 no. 865 (2007): 47–61, https://international-review.icrc.org/sites/default/files/irrc-865-3.pdf.

51 Kristin Bergtora Sandvik et al., "Humanitarian Technology: A Critical Research Agenda," *International Review of the Red Cross*, 96 no. 865 (2014): 219–242, https://doi.org/10.1017/S1816383114000344.

52 Sandvik et al., "Humanitarian Technology: A Critical Research Agenda".

53 Tom Fletcher, "Humanitarian Reset," *OCHA* (blog), 20 February 2025, https://www.unocha.org/news/humanitarian-reset.

the transition of service delivery from humanitarian to local and longer-term development organisations still holds promise.[54] While there are some considerations of how a DPI approach to digitalisation in the humanitarian sector could help fulfil these goals, there are also challenges.

There are challenges when we ask what employing a DPI approach to service delivery within the context of the nexus does *to* humanitarian space. Our analysis of the digital systems that support humanitarian service delivery suggests that a DPI approach to the transitioning of services from humanitarian to development efforts may introduce significant risks to the protection of personal data, as well as a blurring of the lines between humanitarian and development spaces. While there are some technologies that may help mitigate these risks (see below), efforts to progress a more integrated approach to digitally enabled services need to take these risks into consideration when designing and delivering services.

Digital public infrastructure *within* the humanitarian sector has the potential to address some of the endemic challenges that the sector struggles with. If humanitarian organisations could use a shared system for digital identification and payments, for example, it could help reduce the cost of duplicate systems and introduce new efficiencies. This is particularly so for UN agencies, given their resources, but work by the Collaborative Cash Delivery Network (CCD)[55] and the International Federation of Red Cross and Red Crescent Societies (IFRC)[56] around data governance and interoperability indicates this has wider potential and broader appeal too. Given the continuous and increasing funding crises and proposed agenda of reform, this potential to introduce efficiencies and increase effectiveness might be a core consideration for decision makers. A more integrated approach could also introduce benefits for individuals, who would save time by only having to register once, travel less to access services, and enjoy more secure systems to store personal documents and credentials.

Yet as research with humanitarian actors shows,[57] there is significant concern about the implications of linking the different datasets and registries. Many of these concerns are based on institutional politics, whereby some actors may be loath to share data and give up the competitive advantage

54 Caitlin Sturridge and Leigh Mayhew, "Funding Cuts and Nexus Thinking: What Can Aid Actors Learn from the 'Beautiful Game'?" *ODI: Think Change* (blog), 8 May 2025, https://odi.org/en/insights/funding-cuts-nexus-thinking-humanitarian-development-peacebuilding-football/.

55 CCD, "Creating the Ecosystem, Standards, & Culture for Data Interoperability in Humanitarian Action," n.d., accessed 12 June 2025, https://www.collaborativecash.org/data-interoperability.

56 IFRC, "Interoperability," *DIGID Consortium* (blog), 29 August 2023, https://interoperability.ifrc.org/projects/interoperability/.

57 Goodman et al., "Review and Analysis of Identification and Registration Systems".

that holding large amounts of beneficiary data grants when competing for project funding.[58] There are also significant concerns about the data protection implications of linking large datasets of personal data – particularly of already vulnerable individuals.[59] Digital public infrastructure *within* the field of humanitarian response offers opportunities to make humanitarian space more integrated and, through the use of shared systems and standards, more aligned around common principles of data protection.

The role of digital public infrastructure in enabling transitions *between* the fields of humanitarian and development response presents a more complex picture. Integrated and standardised datasets and shared identification systems would enable an easier transition of social registries and data to development actors. States with established digital infrastructure, such as social registries or social protection systems, could integrate those receiving humanitarian support into existing systems. Such approaches could also lead to other benefits such as addressing legal status issues – for example, in mitigating the double registration and statelessness issue of those Kenyan nationals also registered in UNHCR databases.[60] Yet the example of double registration in Kenya also highlights the challenges of getting digitalisation right and the importance of ensuring that appropriate and adequate data protection principles and practices are upheld. There is now widespread recognition that ensuring individual agency over their personal data is a key practice that can help mitigate the unintended consequences of personal data held in humanitarian and State databases.

This challenge is only more significant when considered in the context of significant cuts to humanitarian aid and the closure of humanitarian programmes and support. As humanitarian activity retreats, there may be an expectation amongst some donors that States may take a greater role in managing the identification of and support to those who would otherwise have received humanitarian aid and services, but this assumes that these actors are interchangeable. However, there are spaces where humanitarian action is necessary because States cannot go, such as situations of conflict, and providing aid requires actors able to operate according to humanitarian principles.[61]

58 Madon and Schoemaker, "Digital Identity as a Platform for Improving Refugee Management".

59 Gianclaudio Malgieri and Jędrzej Niklas, "Vulnerable Data Subjects," *Computer Law & Security Review* 37 (2020): 105415, https://doi.org/10.1016/j.clsr.2020.105415.

60 Keren Weitzberg, "In Kenya, Thousands Left in Limbo without ID Cards," *Coda Story* (blog), 13 April 2020, https://www.codastory.com/authoritarian-tech/kenya-biometrics-double-registration/; Wangui Gitahi, "Navigating the Legal Landscape of Double Registration in Kenya," 2024. *Forced Migration Review* (blog), accessed 12 June 2025, https://www.fmreview.org/digital-disruption/gitahi/.

61 Cristina Quijano Carrasco, "Humanitarian Engagement in Social Protection: Implications for Principled Humanitarian Action," *Humanitarian Law & Policy Blog* (blog), 11 February

The transition of services and associated data will imply a transition of personal data that would be given by humanitarian organisations to States – a further blurring of the lines between humanitarian and non-humanitarian or development spaces that have already been complicated by the increased role of non-humanitarian actors, i.e. private sector and particularly tech companies. In order to ensure that humanitarian and data protection principles are upheld, this will require meaningful consent from the data subject, particularly for change of use.

DPI and the Protection of Humanitarian Space and Individuals

There is no single technology that constitutes DPI, and different technologies will afford different outcomes. In considering a DPI approach to address challenges in the humanitarian sector and between the humanitarian and development sectors, it is critical to select technologies that can best uphold humanitarian principles and thus protect humanitarian space. Defining key principles can help provide guidance to ensure that technology selection and procurement support these goals.

Design Principles and Technologies for Humanitarian DPI

Purpose limitation is the first principle that should guide a DPI approach to digital transformation in the humanitarian sector and between the humanitarian and development sectors, though as discussed above there are real tensions with limiting purposes in the expansive vision of DPI. Data minimisation follows as the second principle. By collecting only what is necessary for the humanitarian purpose, organisations can reduce risks associated with data breaches, surveillance, and mission creep. However, the principle of data minimisation may be in tension with the efficiency goals promised by more integrated and interoperable digital infrastructure, particularly when integrating the systems of humanitarian organisations with diverse goals such as collecting data for legal status determination, basic needs assessment, and medical and educational services.

Technologies that support data minimisation include systems that incorporate techniques such as zero-knowledge proofs. Zero-knowledge proofs are a cryptographic method by which one party can prove to another party that they know a value x, without conveying any information apart from the fact that they know the value.[62] For instance, Organisation A could state they have

2021, https://blogs.icrc.org/law-and-policy/2021/02/11/humanitarian-engagement-social-protection/.

62 Shafi Goldwasser, Silvio Micali, and Charles Rackoff, "The knowledge complexity of interactive proof systems," *SIAM Journal on Computing* 18, no. 1 (1985): 186–208, https://doi

Beneficiary A in their system, without sharing the details of that beneficiary with Organisation B. Zero-knowledge proofs require substantial amounts of processing power – more than is available in most smartphones. This means that such proofs are better suited to institutional interactions – such as among humanitarian organisations and between humanitarian organisations and States – which will limit their immediate utility in humanitarian field action.

Privacy-by-design is an established technology design principle that has far reaching ramifications.[63] Rather than treating privacy as an afterthought, adopting privacy-by-design principles would require the selection of humanitarian digital systems that incorporate privacy protections into their core architecture. These protections include measures such as data segregation, encryption, access controls, and automatic deletion after predetermined periods.[64] Ensuring that this design principle is not lost during the transition of systems and data from humanitarian to non-humanitarian contexts is fundamental.

Privacy-by-design principles that might guide the development of digital infrastructure in the humanitarian sector could include deletion policies and processing personal data in a distributed manner, such that biographical data, biometric templates, and biometric images are always physically and logically separated from each other. Privacy-by-design also requires accountability mechanisms, and the design of digital infrastructure to enable the transition and transfer of data between humanitarian and development actors should include elements such as a tamper-proof and secure audit log of all transactions/activities to ensure user accountability and the possibility to reconstruct events and detect potential intrusions, and to identify other problems.[65]

.org/10.1137/0218012. This is the seminal paper that introduced zero-knowledge proofs. For further details: National Institute of Standards and Technology, "Privacy-Enhancing Cryptography (PEC) Zero-Knowledge Proof (ZKP)," https://csrc.nist.gov/projects/pec/zkproof.

63 Ann Cavoukian, "Privacy by Design: The 7 Foundational Principles." Information and Privacy Commissioner of Ontario, Canada, 2009, https://iapp.org/media/pdf/resource_center/pbd_implement_7found_principles.pdf; Jaap-Henk Hoepman, "Privacy Design Strategies (The Little Blue Book)," April 2022, https://www.cs.ru.nl/~jhh/publications/pds-booklet.pdf; GDPR (2016), particularly Article 25 on "Data protection by design and by default", which codifies privacy-by-design into law; Seda Gürses, Carmela Troncoso and Claudia Diaz, "Engineering Privacy by Design," *Computers, Privacy & Data Protection*, 2011, https://software.imdea.org/~carmela.troncoso/papers/Gurses-CPDP11.pdf.

64 Adamantia Rachovitsa, "Engineering and lawyering privacy by design: understanding online privacy both as a technical and an international human rights issue," *International Journal of Law and Information Technology*, 24, no. 4 (2016): 374–399, https://doi.org/10.1093/ijlit/eaw012.

65 Ric Goodman et al., "Review and Analysis of Identification and Registration Systems in Protracted and Recurrent Crises," *BASIC – Better Assistance in Crises. DAI and Caribou Digital*, 2020, https://reliefweb.int/report/world/basic-better-assistance-crises-review-and-analysis-identification-and-registration-0.

Federated architecture with interoperability can help maintain institutional policies and practices around data management yet enable the benefits of a more integrated approach. A federated architecture in which data ownership is maintained by each actor can maintain the independence of humanitarian actors. This approach maintains the autonomy of individual humanitarian actors while enabling controlled information sharing. The governance of interoperability mechanisms is critical, and the right technical architecture combined with detailed data sharing agreements is critical.

Conclusion

This chapter has examined how a digital public infrastructure approach to digital transformation might be part of the humanitarian sector's engagement with the transition of humanitarian aid and relief in the context of the nexus of humanitarian and development response, and increased pressures for efficiency in response to an unprecedented funding crisis. It has explored how DPI's promise of efficiencies and transformation could help respond to both challenges *within* the humanitarian sector as well as to the challenges of transition *between* the humanitarian sector and longer-term, increasingly State-led response. The chapter has reflected on how challenges of governance, namely the protection of humanitarian principles and space, are in tension with a more integrated approach to humanitarian response. However, emerging innovations, such as in privacy-enhancing technologies and privacy-by-design methodologies, could help realise the promise of digital public infrastructure and maintain the protection and principles that are only going to become more important in the face of the ever-growing need for and pressure on the provision of neutral, impartial, and independent aid and relief.