Literature Study

Innovation in Humanitarian Assistance

Commissioning Party:

Policy and Operations Evaluation Department (IOB) – Ministry of Foreign Affairs

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1. Introduction

Despite the expansive growth of the humanitarian sector globally, there is an increasing operational and financial deficit in the capacity of governments and humanitarian organisations to respond to growing humanitarian needs. Over the past decade, the humanitarian sector, including the Dutch Ministry of Foreign Affairs (MFA), has started to invest more heavily in innovation, seeking new and more efficient solutions to humanitarian crises, in order to narrow the funding gap in the sector.

While 'innovation' has become a leading concept in the humanitarian sector, there is currently a lack of conceptual frameworks identifying which types of innovations actually achieve a positive impact for the recipients of humanitarian aid, and which factors enable this. To remedy this and to align investment in innovation with its policy objectives, the Policy and Operations Evaluation Department (IOB) of the MFA has called for a literature study on humanitarian innovation to support a broader evaluation of Dutch Humanitarian Assistance. This sub-study will serve to inform the Policy and Operations Evaluation Department's evaluation of humanitarian assistance of the Netherlands, Funding and Diplomacy 2015-2020.

The primary purpose of the literature study is to gather evidence from the existing literature on the effectiveness of humanitarian innovation and to elucidate whether it can enhance the objectives of Dutch humanitarian policy. A secondary purpose for the evaluation is to identify the most relevant beneficial and hindering factors for a humanitarian innovation's success and how policymakers can maximise conditions for impactful humanitarian innovation. On the basis of the existing literature, the report outlines possibilities for public policy actors to contribute to innovation in the humanitarian sector.

The remainder of the report is structured as follows: The context section briefly describes the current state of the humanitarian sector and forms the basis for introducing the research questions. Thereafter, the scope and limitations of the study are discussed. The subsequent sections outline the methodology employed and offer a meta-description of the data compiled from the corpus of literature that was surveyed. Then, the findings pertaining to the research questions are presented. The discussion section considers the findings in the context of an innovation system and derives a number of recommendations for policymakers. The final section presents the overall conclusions and possibilities for future research.

2. Context

Warner (2017) notes that while the humanitarian sector has always implicitly relied on innovation to improve the delivery of life-saving aid to affected communities, the systematic application, study and implementation of proactive innovation is a more recent phenomenon. Tellingly, in recent years, a growing number of studies is addressing the concept of humanitarian innovation, describing new technologies, processes, and approaches for improving humanitarian aid; addressing funding, budgeting, and institutional support and exploring the challenges of developing use cases and evidence-based practices and the difficulty of bringing innovations to scale. The reasons for this field's burgeoning growth are mainly due to the sector's perceived need to do "more with less", as well as external technological drivers.

Humanitarian needs continue to grow and despite growing levels of absolute funding, UN OCHA (2021) reports a gap of 40% in 2020 between inter-agency appeals for funding of humanitarian assistance and funds committed. Further, it is recognised by humanitarian actors that humanitarian tools and services are in many cases ill-suited to modern emergencies, which are frequently prolonged and conflict-driven (Betts & Bloom, 2014). The humanitarian system is falling short in addressing the needs of such magnitude and diversity.

As a result, pressure has built to fundamentally alter the way business is done, and innovation is considered a vehicle for introducing change. In 2016, innovation was designated as one of the main themes for the World Humanitarian Summit. That same year, the UN Agenda for Humanity stated that to deliver collective outcomes, the humanitarian sector must focus strongly on innovation (UN, 2016). Consequently, a range of humanitarian international organisations have engaged in "the innovation turn", with an increasing number of organisations adopting innovation processes to stimulate new thinking on the provision of humanitarian assistance (Ramalingam et al., 2009). This includes building up dedicated staff, innovation labs, challenge grants or other initiatives to prompt new ways of solving problems and adapting to opportunities. Meanwhile, a growing number of donors, private sector actors, universities, and others outside the traditional humanitarian system have entered into innovation partnerships. An emphasis on innovation in organisational language, culture and activities has started to be implemented by the humanitarian system, for example increasingly embracing experimentation and creative thinking about solutions (Dette et al., 2016).

Innovation in the humanitarian context was conceptualised with a strong link to cost-effectiveness and efficiency. Müller and Sou point out that as a result of this conceptualisation, the focus on innovation in relation to humanitarianism was on 'technical fixes and new products' (2019, 1). Technology has opened the doors for new practices in humanitarian action, such as conducting real-time surveys and needs assessments via the internet or mobile phones or using electronic vouchers for assistance. Artificial Intelligence (AI) is being used for outbreak mapping and early warning, screening, diagnosis, and treatment. 3D printers are supporting the production of equipment in short supply, and unmanned aerial vehicles (UAV) deliver them.

However, while digital and technological innovations are amongst the most frequently mentioned examples of innovations in the humanitarian sector, innovation actually comes in many shapes and sizes. Improved processes between, and enhanced collaboration by humanitarian actors is seen as a key innovation, as is the increased integration of the private sector and market-based approaches. Further, novel ways of dispersing aid, for instance by utilising cash

rather than physical goods, are also making headway. Financing in humanitarian contexts also has seen a number of innovations, such as multi-year (pooled) funding and the introduction of impact bonds. Incorporating beneficiaries into the innovation process is an innovation in itself, which aims to improve the appropriateness of innovations to the local context, while also enhancing agency and building capacities of those involved in the innovation processes. Such innovations represent a broader conception of innovation that relates innovation not only as individual products and services but to overarching strategies and a more holistic view.

These two differing notions of what innovation actually *is* and what its *objectives* are in the humanitarian context point towards a fundamental question of the *role* of innovation in the humanitarian context. The field is currently mired in a vastness of different definitions and conceptualisations pertaining to innovation, its potential for bringing about unintended consequences, and its true transformational capabilities. As a result of the manifold viewpoints regarding innovation, there are also widely diverging opinions around the ability of innovation in achieving desired change as well as what would be required for it in doing so. This study, therefore, reflects on how innovation is pursued in the humanitarian sector and what added value it brings in pursuit of Dutch policy objectives (timeliness, needs-based, effectiveness, principled, and high-quality humanitarian innovation).

3. Research Questions

This literature study aims to gather evidence from the existing literature on humanitarian innovation. It thereby aims to answer the overarching question: **What added value do innovative approaches bring in the pursuit of Dutch policy objectives and what are effective ways for the Netherlands as a donor and diplomatic actor to promote innovation?** To shed light on the ways in which innovation can enhance the objectives of Dutch humanitarian policy, this report addresses the following research questions:

- How has (successful) innovation in different contexts of humanitarian assistance been defined by different actors, and how do actors in different contexts implement innovation strategies?

- What have been successful innovations (or good fails) that have led to an improvement in effectiveness, quality and efficiency of aid in humanitarian crises? To what extent are these innovations scalable (scope) and transferable (context)?

- What are the main drivers (and obstacles) to innovations delivering principled, needs-based humanitarian assistance?

- How can donors and diplomatic actors contribute to the promotion of the identified humanitarian innovation?

4. Scope and Limitations

In order to address the stated research questions, this literature study analysed humanitarian innovation including and beyond the ones that have been supported by the Dutch policy since 2015. The aim is to cast a wide net of existing humanitarian innovations that have been successful and subsequently identify evidence of innovations that have brought or could bring added value to Dutch policy objectives (timeliness, needs-based, effectiveness, principled, and high-quality humanitarian innovation).

Drawing on a rigorous, evidence-based approach, this report presents a global snapshot mapping of humanitarian research and innovation in the period from 2015 to 2021. The dataset from which the analysis is drawn constitutes a systematic literature review of both academic and grey literature through which innovation outputs were identified for the period from 2015 up to and including the first half of 2021.

Given the speed of technological change and the innovation conducted in this space, the research is conducted in a fast-paced and active domain. It should therefore be stated that the research cannot provide an all-encompassing static overview of all activities in this field. Instead, it provides insight into the current trends, activities, and developments. Therefore, in line with the project specifications, the research paper will focus on currently available and in-use solutions as well as emerging technologies with high potential. Predictions on 'unknown-unknowns' technologies are not included in the study.

Due to the sensitive nature of innovation in humanitarian assistance and its impact on human lives, as well as the complex multi-stakeholder context which includes a variety of actors with differing roles, perspectives, and interests, it is vital to specify the scope and limitations of this study.

Lack of Common Language

There is a lack of common language and conflicting opinions on what role humanitarian innovation should play in the sector. This makes it hard to develop a common narrative for analysing the role of humanitarian innovation in the sector. The literature review therefore will aim to explicitly indicate such conflicting opinions on the (potential) role and contributions of humanitarian innovation.

Defining "Humanitarian Innovation"

The lack of a commonly agreed-upon definition of humanitarian innovation makes it difficult to gain a full overview of all innovation efforts in the sector. As not all efforts which could be considered innovations within the humanitarian sector are defined as such, it is impossible to include all of these in this literature study.[1] The literature review, therefore, started from a working definition of humanitarian innovation by ALNAP 'an iterative process that identifies, adjusts and diffuses ideas for improving humanitarian action' (Warner, 2017, 6). However, while this working definition was used as an initial

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[1] For further information on the selection of relevant literature within this study, see the 'Methodology'.

basis for the collection of relevant literature and gaining an overview, it was further reviewed and specified during the study in order to answer Research Question 1.

Defining "Successful Innovation"

A similar issue holds for what is considered to be "successful innovation" and how this should be measured. It is, however, clear that due to a lack of common definitions and agreed-upon frameworks for measuring successful innovation, what constitutes success is often defined on a case-by-case basis. This includes a wide range of factors related to, amongst others, the (foreseen) impact of innovations and their (potential to) scale.

Building on the framework developed by Elrha and ALNAP, we attempt to assess whether humanitarian innovations are able to meet the following success criteria: consolidated learning and evidence; improved solution (meaning the innovation has a positive impact on the user compared to previously used solutions); and adoption (Warner, 2017).

Dutch Policy Objectives

The literature review's aim is to analyse whether and how humanitarian innovation is able to deliver upon the Dutch policy objectives. These objectives are broadly defined and consist of: the delivery of timely, needs-based, effective, principled, and high-quality humanitarian assistance, coupled with the ambition to be coherent with broader development approaches and crisis responses.[2]

As the objectives of humanitarian innovation are often not defined in these terms and since there are considerable limitations in terms of how humanitarian innovation is evaluated (see above), it is not possible to determine whether humanitarian innovation, in general, has been able to deliver upon the Dutch policy objectives. Rather, this can only be determined on a case-by-case basis.

Ethical Considerations

The aim of the literature review is not to judge humanitarian innovation against other types of humanitarian endeavours. No arguments will be made whether innovation is a superior investment when compared to other forms of humanitarian aid, that is, no cost-benefit analysis will be conducted arguing for or against the merit of a Euro spent on innovation versus a Euro spent on other forms of aid. Rather, we will contrast innovations against one another and judge their merit based on the derived framework of what defines a "successful" innovation.

Focus on donors & diplomatic actors

By focusing on the largest donors, we implicitly focused only on donors providing aid to foreign countries. This has led to us (partially) neglecting for instance the massive humanitarian investments pursued by developing, emerging, and middle-income countries within their own borders.

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[2] In light of the first research question, we reflect how humanitarian innovation has been defined within the sector, as well as which strategic objectives are often pursued through humanitarian innovation

Sample Representativeness

Whilst analysing the literature on humanitarian innovation, the innovations described in the literature were overwhelmingly portrayed positively, comprising 'successful' cases of innovations that improved conditions for affected populations or humanitarian practitioners. In this, we suspect a case of survivorship bias in the reporting on innovations, blurring the extent to which innovations can fail. Survivorship bias can lead to overly optimistic beliefs because failures are ignored because innovations that no longer exist are excluded from analyses of performance. In writing this report, we paid close attention to including failed cases whenever possible and took into account lessons learned from such failures.

5. Methodology

Data from various sources inform this report and its findings (including existing systematic reviews, evaluations, policy reviews, academic literature, and other research reports). The primary dataset was collected through a systematic literature review (SLR), where academic databases (Google Scholar, SCOPUS, Web of Science) were searched with the keywords "humanitarian innovation".

Furthermore, data from grey literature was collected, focusing on documents from donors, social sector actors, and humanitarian agencies not found in academic databases. As there is no comprehensive centralised database for this type of practitioner literature, a purposive sampling approach was applied. Relevant documents were gathered from a number of key sources (e.g. Reliefweb, The New Humanitarian, ALNAP, Elrha, Humanitarian Innovation Fund, Dutch Coalition for Humanitarian Innovation, The Humanitarian Practice Network, individual donors, UN agencies, etc.). The grey literature sources were compiled by leveraging the knowledge of the MFA, the research team itself, and an expert interview. Overall, we considered 302 articles from the grey literature for data extraction. The exhaustive list of grey literature sources is given in the appendix.

Subsequently, we screened titles and abstracts of the articles to ascertain whether they are relevant for answering the research questions. Each document collected was reviewed by the Research Team and coded in a database. In coding, we differentiated on two levels of analysis. Firstly, the "article-level", where data from the entire article was considered, and secondly the "innovation level'', where we coded information pertaining to specific innovations. We analysed individual innovations mentioned in an article only when the article went into considerable depth on describing that innovation's functionality, implementation, and the outcome it achieved. Mere mentions or brief descriptions of an individual innovation were regarded as insufficient. The data from the database was then used to infer the results, both in terms of frequencies and recurring output patterns as well as in synthesised narratives. The full description of the methodology for conducting this systematic literature review, including the codebook, is given in the appendix.

6. Data Description

In this section, a meta-description of the literature constituting the corpus is provided. Overall, 301 articles were analysed. These articles were published during the time period from 2015 until June 2021. Of the articles analysed, 111 were academic and 190 practitioner literature. The number of articles on humanitarian innovation has been steadily increasing since 2015, indicating the concept's persistent and increasing relevance in the sector.

Of the academic literature, most articles were published in journals. The practitioner literature mostly consists of reports (either published by donors or by practitioners working in the field). We observed three types of research methods: qualitative, quantitative, and mixed research. The large majority of the surveyed literature was qualitative in nature.

In the qualitative research type, the type of research is mostly in the form of a "case study", which, for instance, describes the introduction of specific innovations in a context. "Theoretical article" stands for articles that describe innovation in the humanitarian contexts generally, and what potential use cases for them could be, without going into detail on a specific innovation having been introduced. Literature reviews synthesise existing literature on a subject. "Monitoring & Evaluation" is more quantitatively rigorous than a case study, which is narrative in nature, but does not attempt to establish causation relationships. Reports evaluate larger-scale programmes.
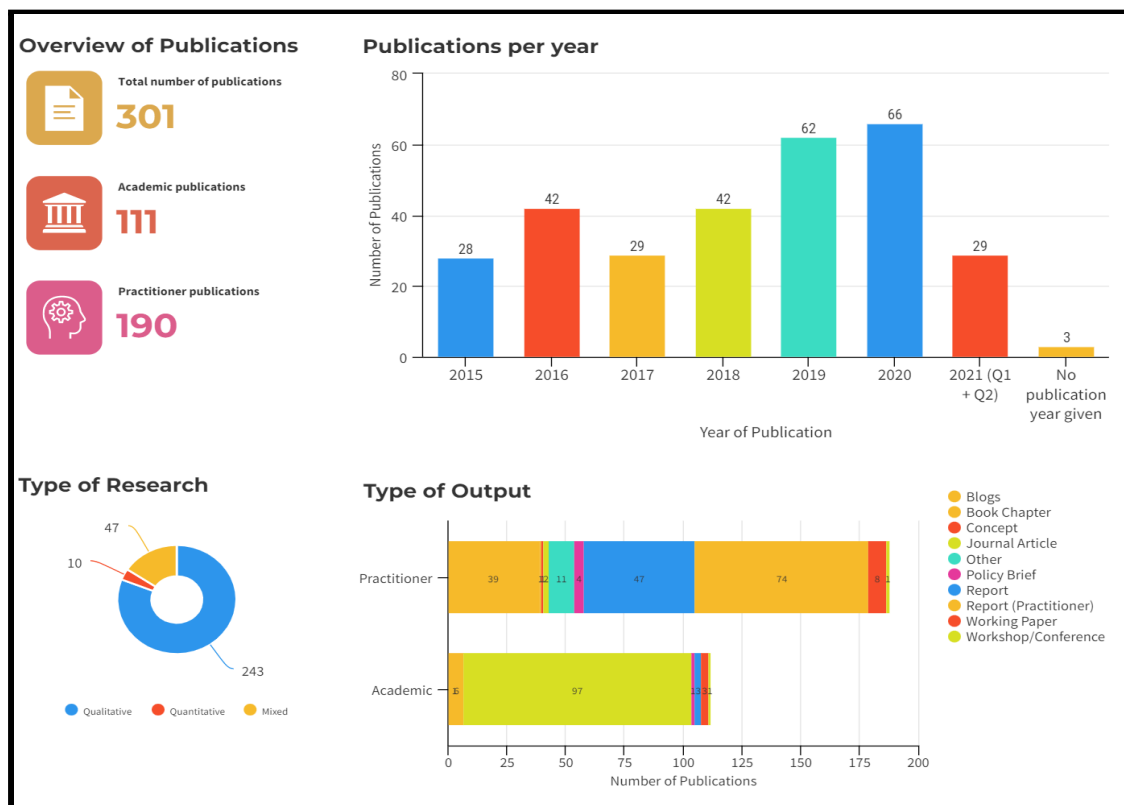
Figure 1. Overview of literature on humanitarian innovation.

6.1. Focus Areas

The articles within the corpus focus on different subject areas in relation to humanitarian innovation. This indicates in which areas innovation is considered most promising or is mostly taking place. The following figure presents the frequency of certain focus areas across the entire corpus.[3]
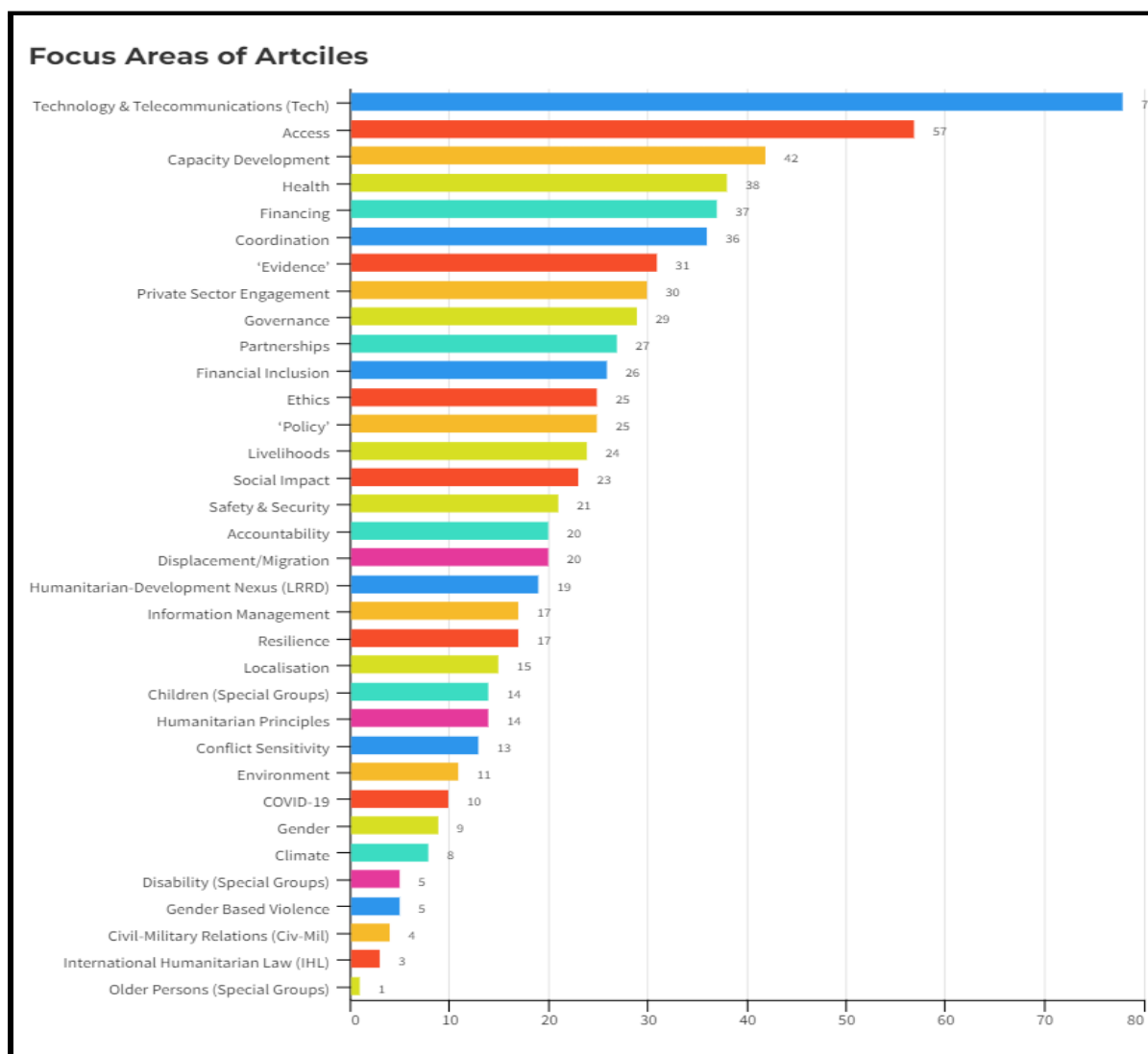
Figure 2. Focus Areas of Humanitarian Innovation Literature

The most frequently covered theme across the corpus is **Technology & Telecommunications**. This seems to indicate there is a considerable focus on the role technology plays in innovation. **Access** is the second most frequent focus area, relating to the ongoing challenge of humanitarian practitioners to access affected populations more efficiently and effectively and deliver necessary goods and services. Other frequently mentioned areas include **capacity development**, **health**, **financing**, and **coordination**. Besides such areas of application, considerable attention is also given as to how

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[3] As articles can pertain to more than one focus area, the total number of focus areas mentioned exceeds the total number of articles in the corpus. The category label of "other" focus areas, numbering 120 articles, was removed from this figure.

innovation should be conducted as is manifest from the frequency in which articles discuss issues such as **collaboration**, **ethics**, and **evidence**, **partnerships,** and **private sector engagement**. Certain topics are clearly more trend-related such as demonstrated by the recent focus on **COVID-19** in humanitarian innovation literature since 2020.

6.2.   Sectors & Clusters

This section describes the sectors at which different humanitarian innovations are directed.[4] While the previous section described the focus of the articles in their entirety, here the sectors into which individual innovations belong are described.

Sector/Cluster	Frequency. Mentioned	%
Coordination & Support Services	33	10.31%
Health	24	7.50%
WASH	19	5.94%
Emergency Telecommunications	18	5.63%
Logistics	18	5.63%
Education	15	4.69%
Food Security	13	4.06%
Protection	11	3.44%
Early Recovery	7	2.19%
Camp Management & Coordination	4	1.25%
Shelter/NFI	4	1.25%
Child Protection	3	0.94%
Mine Action	3	0.94%
Nutrition	3	0.94%
Multi-sectoral possibility	**82**	**25.63%**
Sector Not Specified/NA/No further mention	**63**	**19.69%**
Total	**320**	**100.00%**

Table 1. Sectors and Clusters of Humanitarian Innovation Activity.

The results highlight that **Coordination & Support Services** is the leading sector in terms of where innovations are introduced in the humanitarian context. Secondly, innovations within the **Health** sector are prominently featured. Other notable clusters include **Logistics**, **WASH**, and **Food Security**. In addition to innovations being directed at specific clusters, we also noted innovations with either **Multi-sectoral possibility**, meaning an innovation could be used in multiple sectors, for instance, drones being used both in logistics (transporting cargo) and early recovery (imaging). Further, some innovations were not directed at any specific sector.

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[4] In 2005, the United Nations introduced the 'humanitarian reform agenda' with several new operational and policy elements to enhance predictability, accountability, and partnership in the humanitarian sector (UNHCR, n.d.). As a result, the 11 Sector Cluster, also known as the Cluster Approach, was introduced as a form of clarification on the responsibilities and coordination. The eleven clusters include Camp Management & Coordination, Early Recovery, Education, Emergency Telecommunications, Food Security, Health, Logistics, Nutrition, Protection, Shelter/NFIs and WASH. This was expanded with Child Protection, Mine Action, and Coordination & Support Services as stand-alone sectors in line with the Global Prioritisation Exercise conducted by Elrha (2017b). These clusters were utilised to group together innovations encountered in the literature.

7. Definitions and Strategies for Humanitarian Innovation

This section presents findings from the compiled corpus of literature regarding how humanitarian innovation is defined. Further, it describes commonly appearing **types** of innovation. Additionally, an overview is provided on the extent to which innovations in the humanitarian sector are **technological** in nature, and who the **targeted end-users** are. Lastly, commonly employed management strategies for humanitarian innovation are outlined.

Research Question

How has (successful) innovation in different contexts of humanitarian assistance been defined by different actors, and how do actors in different contexts implement innovation strategies?

Findings

- No common definition for "humanitarian innovation" exists, leading to many different perspectives on what constitutes or should be considered as innovation;
- Innovation takes different forms (types), and the boundaries between these types are fuzzy and there is a degree of overlap between them. However, most innovation is taking place in the form of products and processes;
- Most of the product and process innovations in the humanitarian sector are digital innovations, indicating that innovations in the humanitarian sector are often driven by technological development;
- The primarily targeted end-users of innovation in the humanitarian sector are donors and practitioners, not affected populations. This means that most innovations are not designed to be used by affected populations themselves;
- There are multiple strategies for managing innovation, however, the management practices described across literature are mostly lower-level ones (i.e. project level in particular).

7.1. Definition of Humanitarian Innovation

This section outlines definitions of humanitarian innovation used in the literature. Bessant et al. note that 'the humanitarian sector is a relative newcomer to innovation, in terms of both practices and literature. There were no publications focused on the subject until 2009, making humanitarian innovation literature around a century younger than the overall innovation management field' (2014, 24). Although there has been a considerable increase in literature in recent years, most articles we analysed did not define the terms "innovation" or "humanitarian innovation", with only

25% giving any kind of definition or stating the purpose of innovation in the humanitarian context. This is symptomatic of the sector, where a common definition or a common language for humanitarian innovation more generally is still missing.

Type of Definition	Frequency
Type of Definition	
Outcome-based	34
Process-based	17
System-based	4
Elements	
Having an idea	26
Executing an idea	20
Addressing a real challenge	26
Add value for practitioners	9
Add value for beneficiaries	12
Involvement of beneficiaries	5
Different perspectives/thinking	7
Technology	7
Collaboration & Partnerships	5
Ethics & Ethical Obligations	2
Type of Innovation	
Products	19
Processes	18
Position	7
Paradigm	8
Business Models	1

Table 2. Definitions of Humanitarian Innovation.

Some articles defining humanitarian innovation do not specifically tailor the definition to the humanitarian context. For instance, Scott-Smith defines it simply as a 'means to do things in new or better ways' (2016, 2). Bounie et al. label it "incremental improvements" (2020, 370), and Krishnan (2020) indicates how innovative solutions encourage new ideas and products to tackle real-time problems. The Swedish Cooperation Agency, Sida, defines it as 'the use of knowledge – ideas, technologies, and processes – into products, procedures and services that bring added value and are new in a specific context' (2015, 5). The concept of innovation can be applied to almost all specialised areas and may include technology, but it is not reducible to technology. Furthermore, as UN OCHA notes, innovation should not be confused with invention: 'Innovation does not require the creation of something novel, it may also include the adaptation of

something existing to a different context. Furthermore, there is no threshold for change to qualify as innovative, as it includes both disruptive as well as incremental innovations' (Betts & Bloom, 2014, 5-6). These relatively broad and practical meanings contrast starkly with that used by the single largest donor, the United States Agency for International Development (USAID), which fuses humanitarian and development approaches, referring to innovation as 'novel business or organisational models, operational or production processes, or products or services that lead to substantial improvements (not incremental "next steps") in addressing [humanitarian] challenges' (2020, 4).

Some practitioners extend these notions by specifying the purpose of innovation and placing it in the humanitarian context. The Humanitarian Innovation Fund (HIF) defines humanitarian innovation both in terms of its foreseen outcome ('a creative solution, or novel idea, which helps address a problem or seize an opportunity') as well as a process ('an iterative process that identifies, adjusts, and diffuses ideas for improving humanitarian action') (Warner, 2017, 6-7). Similarly, Bloom & Betts define it as 'a way of potentially transforming humanitarian practice' (2013, 3) and HIF as a means to 'improve outcomes for people affected by humanitarian crises by identifying, nurturing and sharing more effective and scalable solutions' (2018, 1). Similarly, Betts and Bloom (2014) define it as a process for adaptation and improvement, which includes locating and scaling humanitarian solutions to problems in the form of products, processes, and wider business models.

A more precise definition on humanitarian innovation is provided by Bessant and Tidd, who define it as dynamic processes which focus on the creation and implementation of new or improved products and services, processes, positions and paradigms (2007). These '4Ps' organise innovations into four types, depending on where the proposed improvement or change is occurring. They can be summarised as follows:

- **Product** — changes in the things (products/services) an organisation offers;
- **Process** — changes in the ways these offerings are created and delivered;
- **Position** — changes in the way services are presented to the user and how these are communicated and reframed by government and other actors;
- **Paradigm** — changes in the underlying mental models that shape what the organisation does.

The value added by each of the 4Ps in humanitarian settings, 'implies improvements in efficiency, effectiveness, quality or social outcomes/impacts.' Adding any of these types of value is how "successful innovation" is defined. Furthermore, 'innovations should clearly have the potential to improve operational humanitarian performance' (HIF, 2018, 1). While the 4P model is useful in understanding innovations, some articles discuss innovations that include multiple categories of the 4P model at the same time. For example, 3D printing (Tatham et al., 2015), which in itself is a new manufacturing process, can also lead to a paradigm shift in the thinking about humanitarian supply chains concerning their supply chain configuration, the choice of suppliers, and the delivery mechanism. Despite blurry boundaries, the 4Ps have achieved status as the primary reference point for how humanitarian innovation is defined. Critics have suggested that this engenders an analytical slipperiness, noting 'the difficulty of picking apart the stakes of humanitarian innovation is largely a result of the scale of the "four Ps", How could anyone object to such an inclusive and ambitious reform agenda?' (Scott-Smith, 2016, 3). Despite their tremendous scope, the 4P's are being continuously amended, with additions such as policy innovation or business model innovation coming into the mix. As Finnigan and Farkas state, 'the promotion of the

application of the 4Ps in the humanitarian sector failed to emphasise that the 4Ps act as one part of an overall business strategy. Without the strategy that articulates the intent, business structure, and plan, the 4Ps become simply another process activity to perform' (2019, 6). To this, we would add, that even more than the strategy, the sector is neglecting the process of how innovations are created.

Indeed, innovation in the context of humanitarian aid is framed overwhelmingly as outcome-based. The manner in which innovation is conceptualised in the humanitarian sector does typically not go into detail on the process of innovation, i.e. how innovation is created. Only recently, the process has been considered more from a system's perspective (Ramalingam et al., 2015). The role of multiple actors in the innovation processes and their relationships and interactions has come into view, leading to the idea of a system of innovation. 'An innovation ecosystem is the evolving set of actors, activities, and artefacts, and the institutions and relations, including complementary and substitute relations, that are important for the innovative performance of an actor or a population of actors' (Granstrand & Holgersson, 2020, 3). Characteristic of this system view is the emphasis on the notion of innovation not being a single-actor effort, but rather as a dynamic and emergent process that is the product of multiple actors and their relationships. The system includes both a supply-side (sources of knowledge, finance, skills, policies, etc.) and a demand-side (end-users, donors, etc.) and various mechanisms and agencies responsible for connecting them.

7.2. Types of Innovations

As pointed out in the previous section, the literature refers to different innovation types, along the lines of the 4Ps. This section describes which type of innovation occurs most frequently in the literature.

Type of Innovation	Frequency	Percentage
Product innovation	156	54.55%
Process innovation	148	51.75%
Position innovation	34	11.89%
Paradigm innovation	38	13.29%
Business Model innovation	4	1.40%
Policy innovation	39	13.64%
Multiple	96	33.57%

Table 3. Types of Innovation in Literature.[5]

- **Product / Service** innovation refers to a change in what is offered. Product or service innovations occur most frequently (156). Examples of a product innovation include the development of affordable wheelchairs for use in emergency response contexts (ALNAP, 2015), the development of portable media centres which provide educational resources and tools to refugees and displaced persons in camps in different camp settings (Iqbal, 2017), or ready-to-use therapeutic foods for children with uncomplicated severe acute malnutrition (Kangas et al., 2019);

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[5] The total amount of the innovations exceeds 100% as 96 innovations fit multiple categories.

- **Process** innovation aims to change how a product/service is created or delivered. Within the literature, we found 148 instances of process innovations. Examples include the use of user-centric design to deliver sanitation services in emergencies by projects funded by Elrha's Humanitarian Innovation Fund (Bourne, 2019) or human-centred design approaches by DEPP Labs with the aim of developing more responsive and locally-led humanitarian and preparedness programming (Konda et al., 2019);
- **Position** innovation seeks to change the way in which a product or service is targeted and delivered. Amongst the 34 position innovations mentioned, examples included changes in the location of handwashing materials and facilities to promote and enhance child handwashing (Watson et al., 2020). This category of innovations mostly focuses on targeting previously non-accessible or marginalised communities;
- **Paradigm** innovation relates to a change in the underlying mental models that govern our approach. The relatively large amount (38) of innovations pertaining to this category relates to the focus on driving localisation through humanitarian innovation (Tatham et al., 2017), the introduction of innovative financing mechanisms (Spiegel et al., 2020) or the role of cash-based programming in replacing traditional forms of aid delivery (Heaslip et al., 2018);
- **Business Model** innovation relates to the situation in which a reframing of the current product/service, process and market context results in seeing new challenges and opportunities and letting go of others. Examples include the introduction of joint ventures or social enterprises (Vieille, 2020), or innovative business strategies to bring humanitarian innovations to scale (Gray et. al., 2019).
- **Policy** innovation refers to an innovation that relates to a policy or policy process. The Australian government's priorities on Gender Equality and Women's Empowerment are an illustration of policy innovation. Through these priorities, the government aims to address gender issues, ensuring that women can make their voices heard amidst crises (Australian Aid, 2016);

The majority of humanitarian innovations mentioned across literature constitute either product or process innovation, which tend as a whole to offer more incremental change compared to 'position' and 'paradigm' innovations (Lawday et al., 2017). It is, however, important to note that the different types of innovation have fuzzy boundaries, nor are they exclusive. There can be considerable overlap as to which factors could be considered innovative (Francis & Bessant, 2005). Innovations frequently take on multiple characteristics and can evolve over time. This was also clearly demonstrated by the various innovations which pertain to **multiple types** (96). For example, the mobile Vulnerability Analysis Mapping (mVAM) project of World Food Programme uses mobile technologies to collect food security information remotely (Robinson & Obrecht, 2016a; Morrow et al., 2016). It brings together a wide range of tools to support practitioners in data collection (product innovation) which simultaneously change the ways in which data collection takes place by (process innovation) as well as brings along considerable shifts in the fundamental approach to humanitarian work by facilitating remote operations (paradigm innovation).

7.3. Technological Innovations

According to UN OCHA (2017b), the humanitarian sector has experienced more disruption due to technology in the past decade than in the past 50 years. Notable studies view technology as the prime enabler behind improved effectiveness

and efficiency within the sector, focusing on mobile applications or the role of UAVs, 3D printing, and other cutting-edge technologies. The broader technological development is seen as a fundamental contextual driver of humanitarian action and which types of innovations are ultimately implemented. From the literature we reviewed, roughly 80% of all product innovations were technological in nature. This translates to making up close to 50% of all innovations analysed. Table 4 displays the most frequently appearing digital innovations. Percentages are given with respect to all innovations identified in the corpus:

The technological innovations found in the corpus are ambitious ways for humanitarians to increase their reach, enabling aid workers to make the world legible, to map and understand distant terrains as well as take action at a distance. However, over recent years also a critical literature has emerged on these "humanitarian technologies", questioning the humanitarian sector's "neophilia" and to which extent excessive tech-optimism clouds the judgement on whether an innovation is genuinely game-changing or whether it merely "fiddles around the edges" (Scott-Smith, 2016). The risk is, that due to tech fervour these solutions might take the place at the expense of more routine and less "flashy" activities, which would, however, have a larger impact on affected populations (Scott-Smith, 2016).

Digital Technology Innovations	Frequency	Percentage
Mobile Applications	48	12%
Crisis Maps & Dashboards (incl. GIS)	30	8%
Unmanned Aerial Vehicles (drones)	29	7%
Digital Cash Transfer	28	7%
Internet Access & Connectivity	24	6%
Blockchain (DLT)	18	5%
3D printing	17	4%
Biometrics & Digital Identity	17	4%
Toolset	8	2%
Internet of Things	6	2%
Digital Communication	5	1%
Industry 4.0	4	1%
AI	4	1%
Virtual Reality	3	1%
Other	160	40%
Total	**398**	**100%**

Table 4. Frequently Occurring Digital Innovations.[6]

From the literature surveyed in this review, the three most frequently occurring types of technological innovations are crisis maps, mobile applications, and unmanned aerial vehicles (UAVs).

Crisis maps serve as tools to rapidly gain a detailed overview of a crisis situation. It typically functions by crowdsourcing volunteered geographic information for providing timely information about crises (Turk, 2020). This mode of

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[6] The total number of innovations in this table captures all mentions, however brief, of specific digital innovations in the assembled corpus of literature. The other tables' total of 320 refers to the total number of innovations we analysed on a deeper level.

participatory humanitarian action in which global publics are mobilised to trace digital maps of disaster-stricken sites and to classify, verify, and plot on maps significantly increases the speed and level of detail by which information is provided to responders (Givoni, 2016).

Mobile applications refer to any type of apps or feature that can be used with a mobile phone. Particularly since the diffusion of smartphones, mobile applications have proven a crucial tool for humanitarian practitioners. Some examples include mobile applications for outbreak detection and response in emergency settings, for instance, the "EWARS" app, which provided timely information on epidemic-potential diseases among >700,000 Rohingya refugees across settlements in Bangladesh (Karo et al., 2018). Mobile applications are also being used for storing a person's identity credentials, which is essential to accessing basic services such as voting, healthcare, employment, economic participation, and education (Wilson & Casswell, 2018). Further, mobile phones are used to deliver interventions to address gender-based violence among Syrian adolescent girls and young women, by delivering targeted public safety and information alerts (Yankah et al., 2020).

Mobile phones are also increasingly being used by researchers to facilitate data collection and obtain more reliable information. For instance, mobile voice technology is being used to improve the collection of food security data (Robinson & Obrecht, 2016a) and surveys are conducted via mobile phones for a range of humanitarian projects (Morrow et al., 2016).

Delivering commodities by ground vehicles to people in conflict zones risks the safety of humanitarian aid workers. Hundreds of aid workers are killed, injured, or kidnapped when delivering supplies on the road each year (Jeong et al., 2020). For such safety reasons, but also because **unmanned aerial vehicles (drones)** can deliver critical goods such as medical supplies more rapidly than ground vehicles, these vehicles are increasingly being used in the context of humanitarian logistics (UN OCHA, 2017b; Prasanna, 2021). UAVs are also used for damage assessment purposes, flying over disaster-stricken areas, and delivering imagery (Greenwood et al., 2020).

7.4.   Target End-User(s)

Use of Innovation	Freq. Mentioned	% per Innovation
Use of Innovation by affected communities	76	23.75%
Use by practitioners to direct benefit of communities (i.e. at field level)	69	21.56%
Use by practitioners/donors (i.e. at headquarter level)	99	30.94%
Concept/Strategy Only	76	23.75%
Total	**320**	**100.00%**

Table 5. End-Users Targeted by Humanitarian Innovation.

Humanitarian innovation can broadly be divided into two categories: Innovation that is directed at affected populations as end-users and innovation that focuses on practitioners as end-users. During the literature review four more distinct subcategories emerged

- The first direction sees innovation that aims at the **affected population** to be the end-user, giving a certain amount of ownership to them. This includes examples such as solar-powered saltwater pumps (Prasanna, 2021) or soap with toys (Watson et al., 2019) inside for this end-user emerging in the WASH sector;

- The second direction aims for **practitioners in the field** to be end-users, bringing immediate benefit to the affected communities. Examples of this type of innovation includes web-based disease outbreak detection and response in emergency settings (Karo et al., 2018) or infrastructure innovation such as blockchain technology (Ko & Verity, 2016; Zwitter & Boisse-Despiaux, 2018);

- The third category sees innovation in which **donors and practitioners working at headquarters** are the end-user of the innovation. They have a lesser amount of product innovation among them, instead focussing on process innovation. This category includes multi-year financing (Sida et al., 2019) or novel data-sharing practices such as the OCHA Centre for Humanitarian Data in The Hague, which allows for the sharing of data between donors and practitioners in order to increase the amount of information available and share best practices for more efficient and informed decision-making (de Winter et al., 2019);

- The last category does not mention specific innovations and instead introduces new **concepts, policies, or paradigms** to the field of humanitarian innovation.

Of the 244 innovations that specifically mention targeted end-users, 168 (68.85%) are innovations targeting practitioners, either in the field or at headquarter level. This can be, in part, explained by the incentive system in place in humanitarian contexts, i.e. the market structure of the sector. Concretely, the humanitarian markets' customers (in terms of who actually ends up spending money) are oftentimes not the affected populations but rather the donors. Hence, an innovation specifically tailored to donor desires and immediate needs is more likely to be successful and "purchased", without (necessarily) adding value for the affected population. Finnigan and Farkas make a similar observation, namely that the lion's share of innovation does not ultimately end up in the hands of beneficiaries, but is used by the implementers. They, therefore, beg the question: 'If the value proposition solely focuses on the donor, where does this leave the beneficiary, and how can the humanitarian system re-orientate itself to provide better value to the community in crisis? For example, of all the innovations developed specifically for application in humanitarian emergency responses, such as ICT, drones, remote sensing tools, data capture, near real-time processing, emergency communication, and mapping, how many actually added 'user' value for the community?' (2019, 6). Simultaneously, selecting and successfully implementing appropriate business models to bring promising innovations to scale. Gray et al. (2019) describe that alternative revenue models should be considered to draw a distinction between the target end-users and buyers of humanitarian innovation.

7.5. Innovation Strategies

From the corpus of literature we analysed, little was stated concretely about implementation strategies. Rather, strategies in the sector are more related to the process of creating innovation, managing innovation, and which facets must be specifically considered in the strategies (e.g. diffusion and scaling, design, ethical considerations). How to best manage innovation in humanitarian contexts has received considerable attention through the sharing of lessons learned and best

practices in terms of innovation management as is evidenced by the creation and publication of increasing amounts of resources and toolkits, such as the Humanitarian Innovation Guide or the UN Innovation Toolkit

In line with Obrecht et al. (2017), we determine four engagement strategies for humanitarian innovation.

1. **Project-level strategy** refers to actors focussing on the implementation of a single project, product, or process. This type of management judges each innovation based on its own merits and shortcomings, without necessarily looking at trade-offs and synergies with other innovations or projects.

2. **Programme-level strategy** relates to programmes or organisational units encompassing several innovation processes. Such strategies are increasingly pursued by 'hubs' or 'units' within organisations that work across different sectors or programme areas, overseeing or supporting multiple distinct innovation processes (e.g. UNHCR Innovation Unit, WFP Cooperating Partners Innovation Fund). Similar approaches to managing multiple processes are also conducted by academia (e.g. Oxford's Humanitarian Innovation Project and Harvard's' Humanitarian Initiative). These programme-level strategies frequently employ innovation labs, challenge prizes or accelerators to attract innovators from a variety of sectors to develop innovations;

3. **Portfolio-level strategy** looks at multiple separate innovation projects and programmes. Doing this enables them to fund projects with a range of risk levels and assess them at a collective rather than an individual level, thereby mirroring the approach to investment in innovation in the private sector (Obrecht et al., 2017; Obrecht & Warner, 2016). According to Kasper and Marcoux: 'This allows the positive impact from one or two big, transformational successes in a portfolio can justify the opportunity cost of many failures' (2014, 30). Such portfolio-approaches are oftentimes carried out by independent actors (e.g. Humanitarian Innovation Fund, Global Innovation Fund) creating a more flexible system of funding through a portfolio approach can help maximise scarce resources and social impact.

4. **Systems-level strategy** approaches innovation holistically and is concerned with how each part of an innovation process – knowledge transfer, development, adjustment, and diffusion – is affected by the involved actors, their relationships, and other systems. For example, the Center for Research in Innovation Management (CENTRIM) research on evaluating different systems for innovation would be an example of a system-level scope for assessing and understanding innovation practice (Ramalingam et al., 2015).

For innovation strategies, suggestions are made in the literature on how to best organise and manage humanitarian innovation. The sharing of best practices and lessons learned in **humanitarian innovation management** focuses on different topics, such as human-centred design (Bourne, 2019; Konda et al., 2019), participation and inclusion of local populations in innovation processes (Robinson & Obrecht, 2016b), collaboration with different actors such as researchers or private sector, ethical considerations in designing and conducting innovation in humanitarian contexts (Sandvik, 2019), the role of evidence in guiding innovation processes and its role in driving adoption (Dodgson & Crowley, 2021), or suggestions on how to overcome challenges to scaling humanitarian innovation (Elrha, 2018b).

Although these different level strategies are acknowledged, most of the literature describes humanitarian innovation strategies from a project-level perspective. Programme and portfolio-level analyses are rare and system-level reflections barely exist. This, therefore, limits the opportunities to study humanitarian innovations from a comparative- or systems-level perspective and hence to develop a more holistic understanding for how innovation should be managed.

7.6. Reflection

Although interest is rising in innovation in the humanitarian sector, there is a lack of common language and conflicting opinions on what role humanitarian innovation should play in the sector and how they may offer improved solutions. This is clearly demonstrated by the lack of shared definitions on what constitutes humanitarian innovation. What constitutes innovation therewith in itself seems to be at times a contested topic, making it hard to gain a comprehensive picture of the types of innovation taking place in the humanitarian sector.

Regardless, there has been considerable effort in recent times to share best practices and lessons learned in terms of managing humanitarian innovation around a wide variety of topics. However, most of these reflections are often only related to suggestions on how to improve strategies for managing innovation at a project level - therewith neglecting to draw insights on how to make required improvements for managing humanitarian innovation at higher levels, which can aid in pursuing a more holistic approach towards innovation in the humanitarian system.

When looking into specific humanitarian innovations described within literature, it is apparent that most innovations mentioned constitute either product or process level innovation. This could either pertain to the higher complexity that is associated with conducting other types of innovation. However, it could also relate to an overly narrow focus of what constitutes innovation. This similarly holds when looking into the relatively high number of technological innovations indicating a convergence between digital developments and humanitarian innovation practices (Madianou, 2019).

Lastly, when looking at which end-users innovation is generally targeted, many innovations are directed at improving the operational procedures and processes of humanitarian organisations and donors, instead of being directed at affected populations. Although localisation is pushed as a transformative agenda within the humanitarian sector (UN, 2016), this implicit emphasis on innovation for (non-local) practitioners proves a hindrance for creating more local engagement, local capabilities, and strengthening local actors.

8. Successful Innovations

In this section we review how success is conceptualised in the context of humanitarian innovation. For this, we first describe **objectives of innovation** commonly outlined in the literature. Subsequently, we explore definitions of **success** from the literature and to what extent success is conceived as an innovation reaching significant **scale** and **transferability**. Since the literature is vague on definitions for "success", particularly when comparing across innovations, this section analyses success on a more conceptual level, rather than simply listing cases of perceived success stories. The aim is to facilitate a more nuanced approach to understanding what success means in this context and what the objectives of innovation in humanitarian settings are in the first place.

Research Question

What have been successful innovations (or good fails) that have led to an improvement in effectiveness, quality and efficiency of aid in humanitarian crises? To what extent are these innovations scalable (scope) and transferable (context)?

Findings

- The literature identifies the need for more conceptual clarity regarding the role of innovation, how it is defined and what its concrete (policy) objectives are meant to be. Similarly, what makes an innovation "successful" must be clearly defined across all actor groups;
- Innovations created for the humanitarian sector pursue a variety of policy objectives, which are ambitious in scope and scale;
- Definitions for "success" are not consistently applied in evaluating innovations:
  - Evidence on the success of innovation is not always clear;
  - Different measurement approaches are being used to assess success;
  - It is hard to compare between the success of different innovations;
- There is a lack of evidence on the ability of innovation to scale:
  - There is lack of clear standards as to what it means to scale;
  - There is a perceived lack of resources and capacities to support scaling of innovations;
  - Transferability of innovation is not given a high priority in the literature;
- There is a gap between the stated objectives of humanitarian Innovation, which are ambitious in terms of impact and scale, and the more incremental and tepid approaches regarding how innovation is being actively created (types, i.e. mostly product and process level), managed (project strategies), and shown to be performing (evidence).

8.1.   Objectives of Innovation

Innovations are designed to realise an improvement of current practices, thereby aiming to develop improved solutions for addressing humanitarian crises. The literature outlines a wide variety of purposes and objectives, which we have clustered in the following themes: (1) improving efficiency, effectiveness, and appropriateness of humanitarian solutions; (2) local capacity building (localisation); (3) operations of donors and practitioners, and (4) re-shaping the humanitarian sector.

Improving Efficiency, Effectiveness, and Appropriateness of Humanitarian Solutions

Many innovations focus on improving the efficiency, effectiveness and appropriateness of humanitarian aid through introducing and developing specific solutions. **Effectiveness** means whether and to what extent an intervention is able to achieve its objectives. For instance, Watson et al. (2019) indicate that interventions specifically targeting children's handwashing behaviour may be more effective than traditional hand washing interventions which have been school-focused, resource-intensive and reliant on health-based messaging. **Efficiency** refers to how well resources are being used in conducting specific interventions. For example, in an attempt to lower administrative costs and catalyse more responsive programming, some donors have started to move away from annual towards multi-year and flexible funding. This has also led to a considerable amount of evaluations around piloting innovative financing mechanisms. However, clear benefits of such efforts are not universally accepted. A thematic evaluation conducted by Sida et al. (2019) showed that the cost-efficiency benefits of multi-year humanitarian funding are more modest than had been hoped, whereas a study conducted by IRC (2020) actually indicates that multi-year flexible funding is more effective for affected populations and better value for donors. **Appropriateness** indicates an innovation's suitability to its operational context. Schmitt et al. conduct a qualitative assessment on the use of more participatory methodologies in the process of developing menstruation-supportive water, sanitation and hygiene (WASH) facilities. The study concluded that the 'success and ultimate sustainability of any new MHM programming or facility design is likely to be dependent on how carefully responders consult with girls, women and their communities over time' (2021, 10).

In this thematic cluster, it is notable that the objective for innovation projects is to improve the impact of individual products or processes. A focus on such innovation types tends to lead to implementation of ideas that are based on already existing "dominant designs" and results only in incremental improvements. There is now growing recognition of the potential for improved innovation performance through adopting a more systematic approach and for enabling coordinated learning and cross-fertilisation of approaches within the sector (Rush et al., 2021).

Local capacity building (localisation)

Local capacity building has become a common objective in global humanitarian aid. In essence, local capacity-building strategies aim to develop sustainable mechanisms or product solutions to increase the resilience of the local populations. In some cases, the focus of solutions has been on **education and training**. Lovey et al. (2021) show, for example, that offering higher education in a refugee context can equip refugees with the knowledge and skills to contribute to the improvement and development of health care in their communities. Furthermore, stimulating **innovation and entrepreneurship** has been a central objective of some innovation systems in the local community. In a study conducted

for the Humanitarian Innovation Project, Betts et al. provide several examples how supporting refugee entrepreneurs can 'enable individual refugees to earn an income, but they also contribute to building skills, services, and resources in their communities, creating platforms upon which other people can also succeed' (2015, 7). Lastly, there is a focus on increasing the **participation and inclusion** of (specific) affected populations in the design and implementation of humanitarian interventions. Richard and Kiani indicated in a review commissioned by Elrha that, although systematic and meaningful participation of affected populations is not widely practised, 'some interventions made efforts to include the voice of beneficiaries' and that the inclusion throughout the different stages of the intervention led to more effective and appropriate innovations (2019, 28).

Improving products, processes, or business models of practitioners and donors

Instead of being directed towards affected populations, various innovations focus on supporting practitioners and donors instead. Such innovations may aim at improving **operations and processes** in delivering humanitarian aid. For example, Comes et al. (2018) indicate how different technological innovations enable, facilitate or support the planning and implementation decisions in humanitarian vaccine cold chains for vaccination campaigns. Other objectives are improving **information management and decision-making,** particularly through increased availability of data and new technologies. Examples include the Humanitarian Data Exchange managed by OCHA's Centre for Humanitarian Data which constitutes an open platform for accessing, sharing and using data from hundreds of organisations and dozens of humanitarian emergencies (UN OCHA, 2017a), the use of mobile technologies to collect food security information remotely by WFP's mobile Vulnerability Analysis and Mapping (mVAM) project (Morrow et al., 2016), and the use of innovative simulation and modelling approaches (Scott-Smith, 2016). The improvement of **funding and financing** mechanisms employed by donors, such as pooled financing, multi-year financing, increased funding flexibility, or novel financing instruments. IASC, for example, concluded from a review of financing practices that 'predictable longer term humanitarian funding enables early and rapid response, while allowing for a longer-term planning horizon in humanitarian response, with a focus on resilience, prevention, preparedness, strengthening local capacities, and facilitating a transition to development programming where possible' (2021, 1). Lastly, innovation focuses on strengthening **cooperation and collaboration** between actors within and outside the humanitarian sector. For example, The Grand Bargain, an innovative coordination mechanism between humanitarian actors, recognises the importance of increased cooperation and collaboration between key actors in driving transformation in the humanitarian sector through various innovative approaches. Moreover, various examples of innovative partnership models indicate the necessity of bringing in actors from outside the humanitarian sector (e.g. private sector actors) in order to deliver required skills and expertise in realising innovations (Bounie et al., 2020).

Re-shaping the Humanitarian Sector

Innovations are not only seen as tools to improve and facilitate humanitarian operations, but also as potential game-changers that lead to disruptive change in the sector (McClure et al., 2018). Sandvik (2017) outlines as a type of success innovations that re-shape the sector so it is "**fit for purpose**". This is done by tackling the barriers that affect the sector, removing the internal barriers and negotiating the external ones with other actors in a more efficient way. Having a common understanding of the needs of the sector and the ways success can be defined is key to reducing these barriers

(Ramalingam et al., 2015). New and innovative ways of doing things will help reform a sector that is often viewed as top-down, backward looking and held back by tradition (Scott-Smith, 2016).

8.2.   Definition of "Successful Innovation"

Despite growing investments in humanitarian innovation, little attention is given to defining the concept of "successful innovations". Research conducted by Obrecht and Warner (2016) conceptualises success as either impact (improved solution or generating learning) or adoption (innovation diffused successfully). The success of an innovation is thus judged according to three success criteria:

- **Adoption:** The innovation is taken to scale and used by others to improve humanitarian performance;
- **Improved Solution**: The innovation offers a measurable, comparative improvement in effectiveness, quality or efficiency over current approaches to the problem addressed by the innovation;
- **Consolidated Learning and Evidence**: New knowledge generated or the evidence base enhanced around the area the innovation is intended to address or performance of the innovation itself.

The "improved solution" criterion, raises the question: an improvement for whom? Problems and solutions in the humanitarian sector are multifaceted; what is a "solution" for a donor or agency may not straightforwardly be considered a solution for field staff or affected people

Consequently, a "failed" innovation is one that is not widely adopted and achieves no impact (neither an improved solution nor consolidated learning). Notably, the humanitarian innovation literature distinguishes between "good fail" and "bad fail". An innovation may fail to diffuse, but as long as consolidated learning and evidence is obtained (e.g. to use in future innovation endeavours), it is considered a "good fail".

Obrecht and Warner (2016) additionally mention the following additional success criteria for humanitarian innovation:

- **Involvement and respect of affected people:** Be it directly or indirectly, demonstrating how their rights and interests are respected in an innovation process;
- **Efficient development:** Resources must be used efficiently in the development of innovation;
- **Unique Impact:** When the humanitarian system largely ignores a particular issue, such as (formerly) cash-based assistance or menstrual hygiene, innovations that address such novel areas can have a high degree of risk, but also a unique impact on the system around them.

These factors can be seen as complementary to the above-mentioned ones. However, it is notable that their inclusion already creates overlap with the success criteria defined above. For instance, an improved solution may entail a unique impact and efficient development.

Even such broad concepts of success are not uniformly employed in the literature. Instead, innovations' success are evaluated on a case-by-case basis. In most cases, some key performance indicators are chosen, and depending on the score or points achieved, the innovation is deemed a success. For example, a medical training given to refugees in a

refugee camp was deemed a success based on the number of students enrolling in the course and the score obtained on the final exam (Lovey et al., 2021). These criteria for success are on the output and outcome level, but do not evaluate impact of the intervention, which would need to be evaluated by measuring the effect on health outcomes after the course was completed. Further, if impact is indeed measured, it is typically not through quasi-experimental methods such as randomised-controlled trials, so no clear causality can be established. The lack of hard evidence, particularly regarding the 'impact' dimension, is also frequently noted in the literature.

There have, however, been efforts to evaluate innovations on the portfolio level. Portfolio-wide evaluations may aid in conceptualising success more comparatively, in order to judge innovations' success according to consistent criteria. However, the portfolio evaluations are still mostly being done on the basis of case studies. For instance, the portfolio of Innovation Norway utilises self-evaluation using a pre-conceived framework to judge the success of a select few case studies (Hill, 2018). Similarly, the UK's Humanitarian Innovation and Evidence Programme states that for its evaluation case studies are being used to test and refine the HIEP theory of change and to provide an in-depth understanding of how best to support evidence generation and use in specific humanitarian contexts (Itad, 2014). The use of case studies to evaluate an overall holistic innovation approach may prove disadvantageous, as survivorship bias and selection bias could lead to the chosen cases and their success drivers may not be representative. On the other hand, Elrha's portfolio evaluation analysed the portfolio in its entirety, with pre-conceived success criteria related to outcomes, effectiveness, internal factors, funding, and relevance of the innovation (Lawday et al., 2017).

In the studied literature, we note that the vast majority of sources making explicit reference to a specific innovation framed it in a positive light, i.e. as successful, even when not explicitly calling it a success. We do urge caution in taking these assessments literally, as the manner in how success is evaluated are typically self-assessments by the implementers. This once more showcases the need for more rigorous processes for obtaining evidence (ALNAP, 2018).

8.3.   Scalability and Transferability

The sector has identified a clear need to move beyond the plethora of successful early-stage innovations and develop ways to systemically enable innovation at scale (Elrha, 2018b). Scale is a broad concept without a universal definition. Elrha defines it as 'building on demonstrated successes to ensure that solutions reach their maximum potential, have the greatest possible impact, and lead to widespread change' (2018b, 3). This definition is in line with the way Spring Impact views scale, as 'increasing the impact of an innovation to better match the size of the social problem it seeks to address.' (Elrha, 2018b, 12). None of these definitions sets out a numerical target for scale - in all cases - to be achieved. It instead emphasises the extent to which the innovative solution and associated changes address the problem identified. In these definitions, scale is, therefore, relative to the impact set out to achieve. In the innovation literature more generally, the concept of scale simply refers to the extent an innovation spreads throughout a population of potential users). Even though scalability is frequently portrayed as the "holy grail" of innovation, there is little concrete evidence given in the literature as to which innovations actually scale up and which ones do not.

Transferability refers to how well an innovation can be utilised across different contexts. Transferability is mentioned extremely sparingly in the literature. This seeming lack of concern regarding transferability can have implications for

innovations' eventual adoption, as contexts may be widely different and therefore usability in one does not necessarily imply usability in another.

In the corpus, 41% of articles make no explicit mention of either scalability or transferability. A further 34.4% mention innovations being **scalable**, i.e. having the *potential* to scale in the future. Notably, they do not discuss innovations actually having scaled. Further, 13.2% of the innovations we analysed were discussed in the context of having the potential to scale, however, only in the case that certain conditions are met before (for example, infrastructure or regulatory conditions must be improved before the innovation can scale up). 7.1% of innovations are discussed as having scaled up (ex post) and 2.4% of innovations from the corpus are found to be both scalable and transferrable. Only 1.42% of innovations are identified by authors as being **not scalable**.

Within the innovations that achieved scale, there is a clear trend towards technology-based innovations such as UAVs or Blockchain technology and process innovation such as financial models. These examples also showcase that innovations that scale trend towards targeting practitioners (both at field and headquarter level). This aligns with previous findings that practitioners and headquarters are more often the intended end-user than affected communities.
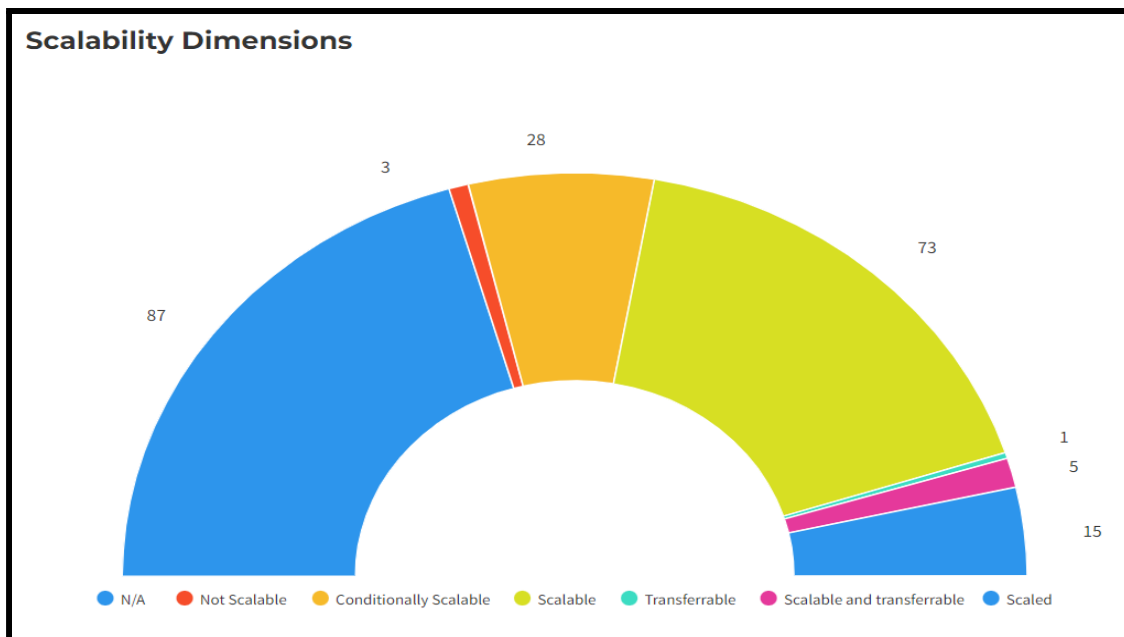
Figure 3. Scalability of Humanitarian Innovations.

Elrha (2018b) outlines a number of major barriers to scaling innovation in the humanitarian sector: First, **too few humanitarian innovations are geared to scale.** Scalability is often insufficiently considered during the early stages of innovation development and funding does oftentimes not specifically hinge upon scalability of an innovation. Also, the humanitarian sector has **insufficiently embedded knowledge and skills** for supporting innovations to scale. The sector does not understand or use the full range of scale strategies available, as done by the private sector. The sector does not yet have hands-on capability for supporting or enabling innovation to scale, due to a lack of personnel specifically trained to support this relatively new paradigm. Moreover, there is a **lack of appropriate and adequate funding** for scaling

innovation in the sector. Supporting an innovation to scale can be expensive and high risk, which deters many donors from long-term financing, which results in funding in the humanitarian sector being generally inflexible and short-term. Core funding, particularly for smaller organisations, is hard to secure, so investment in the organisational capacity to scale is oftentimes limited. There is broad recognition in the sector that the creation or invention of solutions has been supported at the expense of sufficient attention to how to scale them. There is also an **insufficient evidence base** of the impact of humanitarian innovations regarding which types of innovation scale and have impact. This is partially due to a lack of baseline data demonstrating the effectiveness of current practices. The sector lacks both in-depth and sector-wide evaluations of humanitarian innovation. This makes drawing conclusions on which types of innovations (might) scale extremely challenging. Lastly, the structure of the **humanitarian ecosystem significantly frustrates efforts** to scale humanitarian innovation. Uptake of innovation in the sector is often stifled due to the underlying incentive structure, with donors making up the customer base of innovation, and not the affected populations. There is a lack of market incentives that would exist in other contexts. A fully functioning **ecosystem** for humanitarian innovation is missing. These barriers to scale identified in the literature are for the most part also valid for humanitarian innovation more broadly, as will be described in the section on obstacles to humanitarian innovation.

8.4.   Reflection

Similarly to the lack of common language and definition regarding humanitarian innovation itself pointed out in the last section, there are issues regarding conceptual clarity of humanitarian innovation's objectives, and success criteria.

The literature shows that innovations in humanitarian contexts do not pursue or define a singular common (policy) objective, but rather pursue a range of outcomes. This scatteredness of objectives may be due to a lack of coordination, which leads to innovations' objectives being conceived and assessed on a case-by-case basis. The lack of coordinated higher-order objectives or transformational targets makes an overarching strategy regarding innovation difficult, as there is no clear common goal to strive towards. Furthermore, it is noteworthy that the clusters of objectives identified (e.g. re-shaping the humanitarian sector) are ambitious and large in scale, aiming at sector-wide improvements that would be transformational in character. This largely contrasts with how innovation is being handled operationally. As pointed out in the previous section, the types of innovation most frequently pursued are of the product and process type, which typically deliver only incremental improvements. Similarly, innovation strategies pertaining to management are mostly on the level of managing individual projects, which is evidence of a narrow focus.

Consequently, it is also a major difficulty to ascertain which criteria ought to be applied to deem an innovation a "success". Some definitions describe a successful innovation as one that has both impact on the affected population and reaches a significant scale. However, the concept of scale itself is also hardly ever defined in the literature though is oftentimes framed as a major stepping stone for an innovation. In its current iteration, "at scale" is mostly used to mean "reaching many people". Again, this lack of clarity negatively impacts the process of innovation itself. Without being able to judge an innovation's success, and leaving the concept of scale open for interpretation, the incentives to fund an innovation to actually reach a large number of people can be significantly weakened. Hence, there appear to be insufficient efforts undertaken to develop a common language and common practices around these points in order to encourage the implementation of innovation to have clearly determinable effects.

9. Drivers and Obstacles to Humanitarian Innovation

This section outlines the main drivers and obstacles for humanitarian innovation identified from the literature. Frequently, the obstacles are the flip-side of the drivers. It must be stressed that pursuing a driver or facing an obstacle are not guarantees of success or failure. For each innovation a multitude of facets and contextual circumstances must be taken into consideration. The literature, while acknowledging multiple drivers and obstacles, rarely makes explicit their interrelationships. A more holistic perspective would therefore be beneficial to support both innovators and policymakers in how to manage both drivers and obstacles to humanitarian innovation.

Research Question

What are the main drivers (and obstacles) to innovations delivering principled, needs-based humanitarian assistance?

Findings

There are a number of **driving forces** furthering the innovation process and innovation outcomes:

- **Collaboration** between practitioners and donors and participation of affected populations serve the exchange of expertise, information, and resources and can lead to more effective, more efficient, and more appropriate innovation;
- Different mechanisms are responsible for the types of innovations being developed in the sector: on the one hand, situation and requirements in humanitarian contexts dictate the characteristics of an innovation and hence its development (**demand-pull**), alternatively innovations are pushed onto the end-users because donors have a stated preference for these innovations, and the donors are the ones actually paying for the innovations' development (**push**);
- **Technological development** can constitute a driver for innovation, as technologies stemming from outside the humanitarian system are often adopted in the system;
- **Evidence** can be used to inform and guide innovation processes as well as for ascertaining which innovations work and which do not, therewith enabling the funding and scaling up of the most suitable innovations;

Similarly, several **obstacles** inhibit the creation and diffusion of innovations in the humanitarian context. Several of these are the flip-side to the aforementioned drivers:

- Lack of **contextual resources and institutional willpower** to implement change leads to insufficient capacities of communities, practitioners and donors regarding innovation;
- Inefficient modes of **financing and funding** allocation are hindering getting the most value for money spent by donors;

- Lack of **collaboration and participation** leads to duplication of innovation efforts and the creation of innovation unsuitable to affected populations' needs;
- Lack of sufficient **evidence** results in barriers for donors and organisations to allocate funding to the most objectively suitable innovations;
- Overconfidence in technological development can lead to overblown **tech optimism** and over-prioritisation of technological innovations over others;
- Barriers to **local innovation support**, such as political and infrastructural factors in countries affected by crises, can inhibit the creation and distribution of innovation in the local contexts;
- Neglecting **ethics and principles** leads to trade-offs between potential effectiveness gains of an innovation and (humanitarian) principles.

9.1. Drivers of Humanitarian Innovation

This section shows the main drivers and opportunities for humanitarian innovation discussed by academics and practitioners.

Collaboration and Participation

A primary driver for fostering more effective, efficient, and appropriate innovation in the humanitarian sector is collaboration between multiple stakeholders. This refers to increased cooperation amongst donors, for the purpose of agenda setting, amongst practitioners for the sharing of expertise, the inclusion of the affected populations in the innovation process, and the inclusion of private sector actors.

The humanitarian sector is considered to have 'a culture of isolation that creates barriers' (Betts & Bloom, 2014). These barriers could infringe on the relationship between the donors, local communities, and the public sector. Presently, the **collaboration between multiple stakeholders** has become crucial for the continuity and thrive of the humanitarian sector. In the literature, increased integration of humanitarian actors' funding, data sharing, and coordination is recognised as essential for supporting innovation in the humanitarian sector and can indeed be considered an innovation itself (Betts & Bloom, 2014). Several initiatives have been started towards achieving this goal. Famously, following the World Humanitarian Summit (WHS) in 2016, representatives of 18 donor countries and 16 international aid organisations jointly committed to improving the efficiency and effectiveness of international humanitarian aid by entering the "Grand Bargain," which aims to harmonise reporting, reducing bureaucracy, and improving funding and cooperation, and includes a voluntary annual reporting mechanism, supported by an annual independent review, to monitor implementation of those commitments. Additionally, the Global Alliance of Humanitarian Innovation (GAHI) was launched to bring innovative solutions to needs that could not be addressed individually by organisations and actors (GAHI, 2019). Similarly, the World Bank, IOM, UN, UNICEF, UNHCR, WHO, UNOCHA, WFP, FAO, UNFPA, and UNDP made a "Commitment to Action" which defines the new way of working for the UN system and the broader humanitarian and development community. The 'New Way of Working' promotes pooled and combined data, analysis, and information;

improved joined-up planning and programming processes; effective leadership for collective outcomes; and pursuing financing modalities to support collective outcomes (World Bank, 2018). Bilateral collaboration between countries is also a basic form of fostering innovation. For instance, Australia supports partner governments to improve the effectiveness and reach of their own spending on social protection programmes, not through funding directly but by sharing best practices improving efficiency and effectiveness of countries doing their own funding (Australian Aid, 2016). The **collaboration between donors** for the purpose of agenda-setting, sharing of best practices and data, therefore can stimulate and encourage innovation.

The **collaboration with the local community** is a fundamental ingredient for successful contextual innovation. Indeed, authors concur that collaboration with beneficiaries and the community is the most effective way to find suitable innovations to the context and the setting (Krishnan, 2020; Turk, 2020; Dodson & Bargach, 2015; Sandvik, 2017). Community involvement can also benefit the implementers. The benefits include input on innovation creation, feedback on the innovation operation, and innovation promotion in the field for the innovators. For the local population, the benefits include the engagement of locals in new projects, local training, talent development, and the creation of practical solutions (Obrecht & Warner, 2016; Bertone et al., 2018; Heaslip et al., 2018). Oxfam (2019) conveys that the HIF's challenge to pilot user-centric sanitation proves success because it prioritises community engagement and appropriate latrine design. Inevitably, the result of this approach increases the usability and satisfaction of users (Oxfam & WEDC, 2018). The literature also revealed a need to enable the active engagement of groups who may be socially marginalised, such as women, girls, and refugees. By triggering these groups' participation, it becomes easier to identify problems, design solutions, and implement feedback (Schmitt et al., 2021; Oxfam & WEDC, 2018; Bessant et al., 2015; Sida et al., 2019). For example, refugee-led community based organisations in Kampala have founded YARID, a youth organisation run by refugee volunteers, in an attempt to to help refugees in Kampala overcome some of these barriers by providing English classes, social media training, business skills, internet access, women's craft training and more to those living in the city. These kinds of social innovation initiatives often struggle with their own challenges, including finding funding for rent and services, but continue to strive to address the myriad difficulties and concerns faced by urban refugees (Betts et al., 2015). Increasingly, donors and practitioners provide platforms at different levels that are explicitly supporting and committing to initiatives around humanitarian innovation from affected communities through **co-creation** and **bottom-up innovation**(Betts et al., 2015; Scott-Smith, 2016). The DEPP Innovation Labs, for example, not only involve the affected communities, but they also partner with local innovators and entrepreneurs to develop innovations (Konda et al., 2019). Through this approach, one can identify innovators from developing countries with experience and expertise in the field. For instance, user-centred design or design thinking methods hold the potential to facilitate more successful innovation (Bourne, 2019; Oxfam, 2019). They both involve identifying (potential) users, understanding their needs and expectations, and creating design solutions based on these. Further, the Dutch Coalition for Humanitarian Innovation (DCHI) - a partnership bringing together several stakeholders from humanitarian organisations, institutes, governments to the private sector to develop innovative solutions to humanitarian issues - by supporting, for instance, a students' research project that focused on responsible innovation and bottom-up solutions (DCHI, 2021). Another example is the Disasters and Emergencies Preparedness Programme (DEPP) Innovation Labs whose network involves national and international humanitarian organisations, who try to find innovative solutions in areas or issues reported directly from affected communities (Konda et al., 2019).

Over the past decade, faced with growing resource constraints, humanitarian agencies have held high hopes for **contributions from the private sector,** particularly the business community. Initially seen simply as an alternative source of funding, since about 2010, the private sector has been acknowledged as playing other roles, most notably in product and process innovation. It has also been increasingly recognised as operating at various scales, from multinational corporations to national companies to small businesses created by refugees and internally displaced persons. Further, collaboration with the private sector, often in **public-private partnerships** (PPP), has become increasingly common. Collaborative private sector-NGO partnerships allow both organisations to combine their expertise and create contextual, innovative solutions for humanitarian and community-based response, something more essential than ever as new types of crises emerge globally. For example, Mastercard and the World Food Programme (WFP) partnered in 2012 to deliver "Digital Food," linking MasterCard's expertise in electronic payment systems with WFP's expertise in delivering food assistance. The partnership facilitated the delivery of "digital food" in the form of cash and food vouchers via mobile phones or banking cards (WFP, 2017).

Another mode of fostering cooperation is through **intermediaries**. Intermediaries are brokers facilitating the open exchange of new information, knowledge and technological invention between 'seekers' and 'solvers'**.** In response to identified gaps in the ability of international humanitarian action to innovate, such as lack of dedicated resources and spending and constraints in innovation management capacity, a number of intermediaries such as Elrha's Humanitarian Innovation Fund or the Global Innovation Fund has appeared in the humanitarian sector. According to Ramalingam et al. (2009), such intermediaries' purpose is to:

1. Stimulate and shape the problem definition, for the organisation searching for an innovation;
2. Create a process for the exchange of key information between parties;
3. Gather credible evidence of the value of an innovation;
4. Help all stakeholders further develop the market for possible solutions.

Lawday et al. similarly state that their purpose is to 'support organisations and individuals to identify, nurture and share innovative and scalable solutions to the challenges facing effective humanitarian assistance' (2017, 1). The reasoning behind these intermediaries funding innovation projects is to leverage their expertise in innovative products and practices and thereby increase the quality of innovations sponsored. These types of funds largely follow a model of seed-funding, where they provide startup capital for piloting new solutions.

Demands & Requirements of Innovation

Innovations are often driven by necessity. Different contextual requirements demand novel solutions. Across the literature, various such drivers are listed: Innovations can be pushed due to sustainability or services and logistics improvements needs, characteristics of product development or fostered by new methods or strategies. Regattieri et al. (2018) and Caniato et al. (2017) argue that a driver to innovate is the need to be more **sustainable** by, for instance, choosing to reuse materials or promoting sustainable energy. The embracing of **new strategies and models** is also an important factor (Papoulidis, 2020; UNHCR, 2018). For example, Sandvik (2020) emphasises the need for a better method of tracking health and nutrition. Hence, she showcases the development of a wearable necklace that saves the health data of babies to help reduce child mortality.

In terms of product costs, **affordability** is key. Therefore, many authors consider low-cost products as a drive for innovation (Jones & Ballon, 2020; Burke et al., 2016; Krishnan, 2020). Ambruš et al. (2020) state that products or innovations should be simple, resilient, low-priced, and easy-to-use. Access to innovations is increased by rapid **scalability** (Nelis et al., 2020). RISE (Response Innovation for Somalia Emergencies), a mapping strategy approach, possesses great potential to scale innovations that give response to humanitarian needs and challenges (Bryant et al., 2019). Rapid scalability means a prompt response that would benefit a larger number of beneficiaries (Chui & Ko, 2020). This need for rapid innovation, given the context, also affects the phases of prototyping, learning and diffusion (Bessant et al., 2015). The extreme or **complex nature** of a humanitarian context is also considered to be a driver for innovation (Sheather et al., 2016; Scott-Smith, 2016). These conditions force a radical rethink of solution approaches (Bessant et al., 2015). For instance, the Ebola outbreak required rapid innovation and adaptation (Jobanputra et al., 2017). Another driver is the necessity of **improving the services** provided to affected communities, like the coordination, the provision, and the efficiency, as well as increasing the service coverage, especially concerning healthcare (Smith et al., 2020; McGowan et al., 2020).

Additionally, the term **flexibility** is widely commented. Some authors argue the need for flexibility in the context of logistics improvement: by reducing the risk of delivering supplies, organisations can increase the speed and rate in which supplies reach destinations, achieving a timely delivery and directly benefiting the affected community (Jeong et al., 2020; Tatham et al., 2015). Other authors talk about the importance of flexibility in the innovation process. Innovation requires flexibility in terms of timelines, feedback for adaptation while piloting – significant importance must be given to feedback from beneficiaries – or flexibility to execute changes as a response to emerging results (Robinson & Obrecht, 2016a). Innovation labs are being used more frequently as they are believed to allow employees to have more flexibility and freely generate ideas as well as explore different innovation processes (Bloom & Faulkner, 2016).

Furthermore, **ethics** can also contribute and be a driver to humanitarian innovation. The ethical responsibility of humanitarian innovators is frequently stressed in the literature. For instance, Bessant et al. (2015) frame innovation in the humanitarian context as a "life-or-death" issue. Sheather et al. mention that 'the challenges of delivering assistance to people in need mean that innovation is an ethical obligation, specifying that we cannot rely on old solutions to new problems' (2016, 1).

In contrast to this demand-pull type of innovation, donor demand is also a driver of which type of innovations are created and introduced to the humanitarian context. While only in the rarest of cases do public sector donors develop innovations themselves, they nevertheless steer innovators' towards certain products and processes. The literature notes that the innovations created are primarily those "pushed" by donors due to references rather than their objective qualities or suitability (Ramalingam et al., 2015). Also, it has been noted that due to the humanitarian innovation agenda's top-down nature, the focus has been on improving the tools and practices of international humanitarian actors, rather than of affected populations (McClelland & Hill, 2019). Such donor behaviour, be it explicit or implicit, can significantly influence the landscape of humanitarian innovation and tilt innovation efforts towards certain innovation trends and types desired by the donors, be they the most suitable ones or not.

Technological Development

Technology is a direct output of innovation efforts. Of course, technological development, particularly in the form of digitalisation, has been identified as a key influence – and result of – the humanitarian innovation system. In the literature, it is portrayed both as a driver and obstacle. Many articles point to technological development as a main driver to humanitarian innovation (Gaffey et al., 2020; Pascucci, 2019; Zwitter & Herman, 2018; Dandurand et al., 2020). The technological imperative is the idea that new technologies are essential and, hence, they must be developed and introduced in every context needed (Scott & Mars, 2015). The penetration rate of technology is also found to be an important factor for innovation. In a regional consultation report from the World Humanitarian Summit (2016) it is argued that the higher the penetration rate of technology, the higher the opportunity to innovate. Stakeholders recognise the potential that technological innovation has in humanitarian assistance, especially supporting the phases of prevention and preparedness of integrated disaster risk management (European Parliament, 2019). There are different benefits and opportunities for humanitarian aid beneficiaries regarding technological and digital capabilities that authors have identified. There are educational and training improvements, as technology can be used, for instance, to face challenges related to multilingual classrooms (Benton & Glennie, 2016). Mobile technology and internet penetration also bring opportunities for humanitarian innovation (Bolon et al., 2020). For example, mobile learning can be useful to displaced populations (Menashy & Zakharia, 2020). Moreover, technological innovations are driven by needs, issues or challenges surrounding the humanitarian context. Raftree (2020) calls for a digital transformation as users can be hesitant to engage with services that are useful for them mainly due to issues regarding data security. Seifert et al. (2018) argue that due to the lack of available data and forecast accuracy in disaster-affected areas more efforts should be put into increasing the contributions of information and computer technologies (ICTs).

Technological benefits spread not only to beneficiaries, but also to the humanitarian sector as a whole. For instance, digital infrastructure like the blockchain, which was originally developed as a mechanism used for financial transactions, is now used as a tool to improve the complex supply chain of the humanitarian sector (Rejeb & Rejeb, 2020). It can reduce costs and transaction times and increases transparency, allowing information streams to be more traceable (Ko & Verity, 2016). It is also considered as an opportunity to add triple bottom line value (economic, social, and environmental dimensions of sustainability) for all stakeholders involved in the supply chains and logistics in the sector (Rejeb & Rejeb, 2020). Similarly, drones and satellites ease the retention of imagery in areas that are difficult to access otherwise (Quinn et al., 2018).

Evidence-based Approaches

Evidence-based approaches are key to making decisions that are realistic and based on the needs of the affected community. Hence, **data and evidence** play a crucial role in driving and finding opportunities to innovate (Fladvad Nielsen et al., 2016; Nelis et al., 2020; Obrecht & Warner, 2016). It is important to tap into appropriate information streams to make suitable evidence-based decisions according to the humanitarian context (Comes et al., 2018; Nelis et al., 2020). The information provided by evaluation findings enables organisations to determine issues and opportunities for improvement in the humanitarian sector, especially when these evaluations involve the views of beneficiaries and affected populations (Obrecht et al., 2017; Bounie et al., 2020). Karo et al. (2018) emphasise that the information obtained

by the weekly bulletins played an important role in driving public health action across Rohingya settlements in Bangladesh.

Further, there is increased recognition of the importance of evidence in guiding innovation processes as well as in driving and enabling adoption of humanitarian innovation. Due to the high uncertainty associated with innovation, monitoring and evaluation are considered of particular importance to demonstrate the **accountability and effectiveness** of innovations (Obrecht & Warner, 2016; Warner, 2017; Obrecht et al., 2017). The paucity of evidence and the need for innovation to identify and help overcome the methodological and operational barriers to delivering humanitarian interventions has led to the development of new programmes, such as the Humanitarian Innovation and Evidence Programme (Nelis et al., 2020), and specific resources for supporting evidence collection on humanitarian innovation (RIL, 2021; Bryant et al., 2019). Moreover, as evidence serves to shape perceptions of innovation, and so influences whether stakeholders wish to support or take up the innovation, it can also be used to promote **adoption and diffusion** (Dodgson & Crowley, 2021).

9.2.   Obstacles to Humanitarian Innovation

The section explores the major obstacles and challenges to humanitarian innovation as identified in the literature Lack of Institutional Capacities.

An overarching obstacle to innovation, both in terms of production and adoption, is that of **cost** (Lovey et al., 2021; Krishnan, 2020; Jeong et al., 2020; Quattrochi et al., 2019). High costs are an obstacle when innovations are very expensive to produce, or when their implementation is very costly (García-Orosa & Pérez-Seijo, 2020; Ambruš et al., 2020). Delivering certain supplies such as teaching materials can be very difficult and can involve additional costs (Lovey et al., 2021). Deploying WASH facilities in disaster-affected areas, especially by flooding, and increasing resilience are also costly activities (Krishnan, 2020).

Lack of Institutional Capabilities

Insufficient **interest and awareness** of governments and donors is another obstacle to humanitarian innovation. Some authors point to a lack of interest to change the operating mode and unwillingness to reform the system (Papoulidis, 2020; Lenner, 2020; Parker & Alexander, 2021). It is challenging to negotiate across all the different competing interests and perspectives as well as to find the collective awareness to address the issues that arise in the humanitarian sector (Rush & Marshall, 2015; Obrecht & Warner, 2016). There is also a lack of awareness and training within the staff of stakeholders working in the humanitarian phases of preparedness and response (Bounie et al., 2020). Another obstacle is that following the implementation of the innovation, the **operational capabilities** of the humanitarian staff is insufficient. They usually lack the knowledge or training to use the innovation implemented (Greenwood et al., 2020; Bolon et al., 2020; UNHCR, 2018).

McClure and Gray indicate that in order for innovations to become sustainable solutions, innovations must ensure to address the **operational complexity** of humanitarian contexts. They indicate that many innovations are unable to scale after initial validation, because they neglect 'elements of the innovation lifecycle that lie between the conclusion of a pilot

programme and the ultimate wide scale operation and optimisation of an established programme' (2015, 2). Further, the use of certain innovations might require different ways of working, skills and capabilities. It is therefore critical to ensure that existing infrastructures meet the requirements and are compatible for adopting innovations (European Parliament, 2019, 76).

Therefore, more political will is needed to address challenges and insights identified by staff working in situ and turn it into large-scale actions (European Parliament, 2019; Obrecht & Warner, 2016).

Financing and Funding

Even though there has been an increase in funds for innovation in the last years, many authors state that the **lack of financial resources** is still an obstacle to humanitarian innovation (Watson et al., 2020; Caniato et al., 2017; Sandvik et al., 2017; Nelis et al., 2020; Lovey et al., 2021). New methods are being employed by donors to make the funds available more effective. Pooled funds collectively channel more funding (both in volume and percentage terms) to local and national actors than bilateral donors, particularly in conflict contexts (Metcalfe-Hough et al., 2021). Also, donors may achieve better results by donating in the form of multi-annual contributions to humanitarian agencies. (IOB, 2015) Shifting from annual to multi-year humanitarian funding can also aid by giving innovators access to more reliable, long-term funding streams.

However, Jayasinghe et al. (2018) argues that transaction costs are very high in the humanitarian sector, hence there is a difficulty of accessing funding. Also, the financial resources available for innovation are not specifically well-designed for supporting the whole innovation process. Early stages of the innovation process usually have more funding, whereas there is little financing for the adoption and diffusion stages, where programmes often stall (Rush & Marshall, 2015; Sandvik, 2017; European Parliament, 2019). Therefore, innovations often get stuck at the pilot phase, unable to scale and achieve impact, mainly due to the **lack of funding** in these stages, low use of the full range of scalability strategies available, and the short timeframes of action (Sahebi et al., 2020; Elrha, 2018b; Ko & Verity, 2016; Obrecht & Warner, 2016). "Challenge funding" contributes to this "pilot and crash" phenomenon, by which new programmes keep being introduced but then cannot find the long-term financial support they need (Benton & Glennie, 2016). This insufficient support to "follow-through" is also seen in the recovery phase and durable solutions phase, mainly due to donor fatigue and lack of resources (Fladvad Nielsen et al., 2016). Implementable and durable humanitarian innovations are said to be achievable only if sufficient financial support of stakeholders is provided (Scott-Smith, 2016; Scott & Mars, 2015; Heilbrunn & Iannone, 2020), for instance from donors but also from host countries and countries nearby (Redvers, 2017; Betts et al., 2015; Zwitter & Herman, 2018). Stakeholders' support – both financial and political – must be maintained through the whole innovation process, especially in the last stages of implementation and scaling up/diffusion, where evidence collection and impact evaluations are carried out (Rush & Marshall, 2015). Follow-up funding and incubation support can also help the most promising innovations reach scale (Benton & Glennie, 2016).

There is also limited funding for the introduction and implementation of new technologies (European Parliament, 2019). The innovation ecosystem is weakly integrated and there are resources and capacity gaps in the financing, and a lack of access to materials and tools in many instances (Rush et al., 2021; Corsini & Moultrie, 2020). Sometimes the problem is not the funding per se, but the funding appeals that are context-specific, meaning that it is only committed to a specific crisis

(Clarke & Dercon, 2016). Humanitarian innovation, therefore, can be undermined by the political economy as there is a competitive culture existing in the humanitarian sector for both (financial) resources and the interest of governments (McClure et al., 2018).

Challenges around collaboration

Despite the crucial role of relationships, the challenges to collaborate arise due to the **complex array of actors** involved in the humanitarian innovation context (House, 2020; Fekete et al., 2021). Among stakeholders, the two main challenges are the **lack of agreed vision** from the start and **balancing multi-stakeholder interests** (Jobanputra et al., 2017; Moreno-Serna et al., 2020). However, the most considerable challenge remains the collaboration among the stakeholders in the humanitarian sector itself (Bertone et al., 2018). Despite the crucial role of the donors, NGOs, and intergovernmental organisations, the collaboration between these groups has been characterised as dysfunctional. A **lack of collaboration and coordination** is a frequently occurring theme in the literature (Bertone et al., 2018). This creates the situation of working in silos (WHS, 2016), meaning data and best practices are not shared, and efficiency gains are realised more slowly. Also, an isolated way of working increases the risk of double funding activities (European Commission, 2018).

While the need for mechanisms to achieve collaborative ways of working is universally accepted, multilateral support for such a mechanism alone is insufficient. This was shown through the shutdown of the Global Alliance of Humanitarian Innovation (GAHI). GAHI was launched at the World Humanitarian Summit (WHS), aiming to address the innovation needs in the humanitarian sector. However, GAHI never achieved the ambition of the initiating partners and was closed down in May 2019. This failure was due to a lack of a clear plan for operationalisation and its uncertain positioning within the system (GAHI, 2019). Similarly, the Global Humanitarian Lab (GHL), which aimed to stimulate system-wide innovation in the humanitarian sector, was shut down. It listed about 40 partner organisations. But the original concept came to a halt barely two years after its founding, for reasons not disclosed (Parker, 2019). Also, Elrha (2021) reports a 65% cut in funding for its Humanitarian Innovation Fund and an unspecified funding reduction for its Research for Health in Humanitarian Crises project.

Moreover, another recurring theme in the literature is that the **affected population** does not get adequately involved in any stage of the innovation process- from design to production to giving feedback, with Elrha (2017b) suggesting that only 33% of humanitarian innovators consult with affected populations during their innovation processes. Sometimes, the present disconnect refers to a lack of interest from the population (Fladvad Nielsen et al., 2016), meaning that the local population fails to see the benefit or value of the innovation. More frequently, however, the disconnect relates to a lack of contextual design for products and services (Humanitarian Grand Challenge, 2020). An illustration of that is the menstrual hygiene management (MGM) mentioned by (Schmitt et al., 2021). Although the material and product were designed well, there is a lack of water, sanitation, and hygiene facilities for women and girls to use the products. This absence of support structure prohibits the effective use of the MHM, making its design flawed. Involving the community can also be problematic because sometimes stakeholders have limited expertise to work with disadvantaged individuals (House, 2020; Schmitt et al., 2021). Other times, the issues are that when recruiting target groups, one can face impediments with group access, privacy, language, and gender roles (Schmitt et al., 2021).

In addition to the lack of local community involvement, there is also an **absence of local partners** in innovation processes (Fladvad Nielsen et al., 2016; Humanitarian Grand Challenge, 2020). There are three challenges when attempting to define innovation needs without the local actor's expertise. Firstly, it is not always clear who the beneficiary is. Secondly, it is not transparent who can be a compelling voice of beneficiaries. And thirdly, it is not evident whether beneficiary representatives have an in-depth understanding of beneficiaries' needs (Rush & Marshall, 2015; Kangas et al., 2019). The inclusion of such partners can make products, services, and practices coming from international organisations more connected to end-users (Humanitarian Grand Challenge, 2020).

Lack of evidence and data availability

The lack of data and evidence available leads to challenges for humanitarian innovation. There are under-researched topics, such as the potential of operation management to aid humanitarian processes, and little empirical evidence of certain innovations, like mobile clinics or innovations for durable solutions (Nelis et al., 2020; Burke et al., 2016; McGowan et al., 2020; Humanitarian Grand Challenge, 2020). Besides, there is little evidence that can be used by humanitarian innovators to decide on the most suitable resourcing model and few use cases based on hard evidence that can help justify and guarantee scaling (Obrecht & Warner, 2016; European Parliament, 2019). Thus, innovation information needs to be strengthened and more rigorous quality assurance techniques should be implemented to monitor accuracy (Rush et al., 2021; Turk, 2020).

Obstacles Arising from Technological Development

Regarding the limitations or challenges of technological innovations in the humanitarian sector, some literature argues that there is an "overblown **tech optimism**" (Menashy & Zakharia, 2020) that makes innovators to narrowly focus on technological solutions instead of other approaches, leading to missed opportunities (Smith et al., 2020). The humanitarian neophilia concept relates to such overuse of technology. The importance of it lies in understanding the optimistic faith in the possibilities of technologies and commitments to the power of markets. Scott-Smith (2016) uses this concept to criticise the expansion of technological development and its play in the humanitarian sector.

Furthermore, the processing of some types of **data** such as drone or satellite imagery, which often relies on machine learning algorithms, is oftentimes not yet reliable without human quality control. A more uniform data quality and standardisation must be reached, processing made reliable, and only then can more data-driven services be provided by donors reliably (de Winter et al., 2019). The emphasis on using data responsibly also occurs frequently, while also the need for extensive training of human resources for new data-driven methodologies is pointed out (Turk, 2020; de Winter et al., 2019).

Further problems may be caused by the **infrastructural requirements** for technologies, which in crisis contexts are often not given for adequately operating high-tech equipment (European Parliament, 2019). Further, overly relying on technology may widen the so-called **digital divide** between those affected people who have access to technologies, thereby reaping their benefits, and those who cannot access them, who come away empty-handed (Raftree, 2020; UN OCHA, 2021).

Barriers to Local Innovation Management

Another challenge surrounding humanitarian innovations is the insecurity and **uncertainty of the local context** (Munyuzangabo et al., 2021; Gaffey et al., 2020; Bessant et al., 2015; Sahebi et al., 2020). There are oftentimes uncertainties concerning the political system of the country or region, the economy, and the needs of the affected population (Seifert et al., 2018). The **political and regulatory barriers** also pose obstacles to innovation, especially bottom-up innovation, and local innovation (Greenwood et al., 2020; Caniato et al., 2017; Ko & Verity, 2016; Benton & Glennie, 2016). Affected communities, for example refugees, have precarious legal status, lack of access to finance and housing, lack of right to work, difficulties when attempting to get an education and are subject to discriminatory practices and police harassment (Betts et al., 2015; Heilbrunn & Iannone, 2020; Easton-Calabria & Omata, 2016). Hence, larger systemic issues and regulation inhibiting the free exchange of ideas and innovation prove great obstacles to creating a conducive innovation environment (Scott & Mars, 2015; Pasha, 2020).

Further, delivering necessary supplies for innovation, such as teaching materials, can be difficult and involve additional costs (Lovey et al., 2021). Deploying WASH facilities in disaster-affected areas, especially by flooding, and increasing resilience are also costly activities (Krishnan, 2020). Lacking **suitable infrastructure** in humanitarian settings exacerbates the challenge of promoting and implementing innovation (Fekete et al., 2021; Tatham et al., 2015; Karo et al., 2018; Humanitarian Grand Challenge, 2020). For instance, crisis-affected areas usually have inefficient cold chain management and lack reliable cold storage for vaccines, making the admission of (novel) vaccines problematic. (Comes et al., 2018)

Ethics and Principles

Ethics, per se, is not an obstacle - in fact, it can sometimes even be considered a driver for humanitarian innovation - but the tendency to not comply with ethics is considered an obstacle in innovations. On many occasions, innovations, mainly technological ones, are introduced and deployed in humanitarian contexts without first assessing the harms they may cause to human beings and how they comply with the humanitarian imperative of "do no harm" (Sandvik et al., 2017). The increased collection and use of data and evidence in the humanitarian sector has also raised ethical concerns (Sandvik et al., 2017, Sandvik, 2020). Hence, the literature points to taking the following ethical considerations into account when innovating and introducing innovations in humanitarian settings.

Responsibility and accountability of innovators

As innovation brings forth considerable uncertainty given the introduction of new processes and strategies, it sets considerable challenges to stakeholders engaged in the innovation process as to how to manage associated risks (either foreseen and unforeseen) and ensure their accountability. In terms of engaging local communities in innovation processes, the notion of (informed) consent is put forward. Besides following a consent process, there are two other additional aspects to consider: the sources and the consequences of the community consent one is acquiring (36). In terms of accountability, it needs to be decided who the lead agency should be and the level that should be set up as well as how rigorous the mechanisms for its compliance and enforcement should be (Wang, 2020). In addition, there is usually a lack of deep understanding of responsibility and accountability among stakeholders. This creates a moral hazard as practitioners potentially cause harm to the individuals they mean to protect due to the introduction of new technologies, innovations and actors into the context with insufficient caution. Such blind adoption can aggravate conflicts and inter-group inequalities (Wang, 2020; Miklian & Hoelscher, 2018; Raftree, 2020).

Given the lack of common and implementable ethical **guidelines and standards** in the context of humanitarian innovation, the literature, calls for an ethical framework to ensures that stakeholders clearly identify ethical issues, guarantee the innovation's respect for human dignity, clarify the level of involvement of end-users, assess harms and benefits guaranteeing no harm to non-beneficiaries, ensure the access to the innovation, and, lastly, implement and scale-up the innovation using evidence-based decision-making (Sheather et al., 2016; McClure et al., 2018; Taylor, 2016; Sandvik, 2020; Lovey et al., 2021). In order to effectively address such ethical challenges associated with innovation, an increasing number of guidelines and toolkits have been developed in recent years to share best practices and lessons learned (Sheather et al., 2016; Owen et al., 2013; Elrha, 2017a; Principles for Digital Development, 2021).

Risks and ethical challenges of new technologies

There are technical trade-offs when introducing **new technologies** in a setting as well as societal implications , resulting in a mismatch between technologies and humanitarian principles (Sahebi et al., 2020; Talhouk et al., 2020). Introduction of new technologies could for example increase exposure of already vulnerable communities. For example, social media could expose children to online bullying and abuse (Raftree, 2020). New technologies could further introduce challenges due to, for instance, the lack of suitable infrastructure (Greenwood et al., 2020), and limited technological knowledge of stakeholders (Hossain & Thakur, 2021). There are also specific risks of different technological innovations, due to their **dual-use** nature. Drones, for example, provide considerable benefits for amongst others transportation and logistics, but could simultaneously be used as weapons (Jeong et al., 2020). There are also uncertainties surrounding data use. **Data risks** can include, for instance, the selling of personal data of beneficiaries and affected communities, privacy and data ownership concerns, the collection of sensitive demographically identifiable information, and the misuse of data for military purposes, among others (Raftree, 2020; Smith et al., 2020; European Parliament, 2019). Biometrics, for instance, constitute a real danger for the affected community as they entail the collection of extremely identifiable personal data of beneficiaries which can be used ultimately for other purposes, posing cybersecurity and digital risks (Sandvik, 2020). Hence, data risks exist during its collection, storage, and usage (Wang, 2020).

10. Current Donor Activities in Humanitarian Innovation

The context in which donor governments are implementing humanitarian aid and policy is continuously changing, with crises increasing in complexity, duration, and scale. As a response, the increased and targeted employment of innovation to improve efficiency and effectiveness of humanitarian outputs has been a focus area across donors in order to future-proof the sector. The term "donor" used here refers to international governmental donors, not private ones. This section outlines the thematic clusters we identified from the literature as to how donors are attempting to strengthen the humanitarian sector through innovation. Our primary takeaway is that donors are currently overly focussing on individual innovation outputs and insufficiently conceptualising the humanitarian sector on a systemic and holistic level.

Research Question

How can donors and diplomatic actors contribute to the promotion of the identified humanitarian innovation?

Findings

The findings outline donors' current main role and efforts regarding humanitarian innovation. The following clusters of donor activities were identified:

- Innovations are pushed by preferences and **demands of donors**, therewith not necessarily matching the needs and requirements of both practitioners and affected populations;
- In order to meet the **needs and requirements of affected populations**, it is of importance to include and engage them in defining innovation agendas and conducting innovation;
- Further investment would support ongoing efforts in the sector focussed on increasing **collaboration, coordination, knowledge exchange and bundling of resources** within the sector;
- While **private sector actors** are considered as a key player for driving innovation in the humanitarian sector, there are considerable concerns regarding their interests and modes of operation and how to balance this with humanitarian practices and principles;
- Although **evidence** is seen as key for supporting decision making around investing in innovation, it is recognised that there are considerable challenges in terms of how evidence on innovations is being generated and made available;
- Adequate **funding** is seen as a primary enabler of humanitarian innovation. Although donors have increasingly made available targeted funding and opportunities for supporting innovation through core funding, there are considerable requests to donors to offer more flexibility, longer-term funding and targeted funding for scaling innovation specifically;
- The lack of a required **competence and culture** vis-à innovation amongst donors and practitioners is often seen as obstacles for innovation in the humanitarian sector;

> - The humanitarian sector is increasingly recognising that its current operating mode insufficiently deals with the root-causes of crises and should strengthen the **transition from humanitarian relief to development**.

10.1. Pushing Demanded Innovations

While only in the rarest of cases public sector donors develop innovations themselves, they steer innovators' towards certain products and processes. The **market constellation** in the humanitarian sector differs in many ways from private sector markets, as the donors are the primary customers of innovation, not the affected populations. Hence, negative user experience is far less likely to result in the discontinuation of an innovation, as long as the donors remain willing to fund the innovation. The literature frequently notes that the innovations created are oftentimes "pushed" by donors due to donor-preferences rather than their explicit qualities. A pressing issue related to the meaning of innovation for the sector is therefore to resolve the question of who the "customer" of the innovation is. For most humanitarian agencies, the donor is the customer and the community where the innovation is applied is the beneficiary (Finnigan & Farkas, 2019). As such, organisations are expected to provide the best value proposition as perceived by the customer, i.e. the donors. Donors interests' in certain innovations clearly pushes agencies and innovators in that direction. For instance, donor push is among the main factors for the implementation of mobile clinics, which try to solve the lack of healthcare workers. Yet, evidence shows that mobile clinics may not have a better performance than traditional clinics in some humanitarian settings (McGowan et al, 2020). Nevertheless, due to donors pushing this innovation, the chance of repeat business then increases, either from the existing opportunity or another opportunity in the future. Thus, policies that underpin the funding may inadvertently push and pull humanitarian practitioners and organisations towards practices that inhibit, restrict or stifle effective innovation. Such donor push of innovation may result in less effective, efficient, and appropriate innovations. Donors need to be aware of this influence and maximise the likelihood of the innovations they fund to concretely benefit the affected population, by insisting on a clear evidence base.

10.2. Inclusion of the Local Population in the Innovation Process

The literature laments the underdeveloped inclusion of the local population, i.e. those people actually affected by a humanitarian crisis. Particularly, the inappropriate design of offered solutions due to exclusion of affected populations from the innovation value-creation process and a resultant foregone opportunity for building capacity and resilience.

The humanitarian system is heavily invested in innovation that can improve responses by international organisations. However, products, services, and practices often result in a disconnect with end-users, as they may realise little actual benefit from the innovation (Obrecht & Warner, 2016). In part, this is because the design of the products and services that are sponsored by far-away donors are inappropriate for the local context. When the conditions are not well known or rapidly changing, better outcomes result when those affected are in control of, or at least involved in, the innovation processes. Therefore, they must be able to innovate autonomously to deal with needs (Bahadur & Doczi, 2016; Honig, 2019). The need to recognise the specific culture, context and social norms of the humanitarian setting is stressed by humanitarian practitioners and donors alike (European Parliament, 2019). There is a lack of humanitarian funding available to support such initiatives explicitly involving affected communities. Oftentimes, funding that is channelled to

"local" partners tends to go through NGOs that may have little representative relationship to crisis-affected communities. Funding requirements and accounting and auditing standards need to be adjusted to enable affected communities to access seed funding and encourage innovation by and for crisis-affected populations (Betts et al., 2015). Enhancing funding mechanisms, to facilitate supporting user-centric innovation by and for affected populations and local organisations necessitates creation of an environment where interactions will be more inclusive and language sensitive, and local populations are able to meaningfully contribute to discussions and decision-making with support and resources available to take on national or subnational co-leadership roles, where appropriate (IASC, 2020). IASC (2020) advocates for a wide form of local engagement, by recognising and supporting the role of mayors, village elders, faith leaders, camp or community leaders in the innovation process.

10.3.   Increased Collaboration Between Donors and Practitioners

As already outlined in the section on drivers of innovation, an increased integration of humanitarian donors' and practitioners' funding, data sharing, and coordination is recognised in the literature as essential for supporting innovation in the humanitarian sector, considering that the humanitarian sector was said to have "a culture of isolation that creates barriers" (Betts & Bloom, 2014). Hence, there has been the call to implement not so much a traditional coordination mechanism but rather a functional ecosystem in which actors can work collaboratively together. Collaboration is typically portrayed on two levels:

The **bundling of resources** occurs, for instance, between EU Member States, who jointly fund "EU Horizon 2020," a research and innovation programme. This programme, amongst a myriad of other initiatives, launched an Affordable High-Tech for Humanitarian Aid prize, which facilitates the development of innovative solutions for the delivery of humanitarian aid. Going beyond mere funding, the pilot programme European Innovation Council (EIC) brings together the parts of Horizon 2020 that provide funding, advice, and networking opportunities for entrepreneurs, small companies, and scientists to scale up innovations internationally. EIC, for example, offers grants for challenges such as 'Early warning for Epidemics' and 'Blockchains for Social Good' (EIC, 2020). Other notable examples of combined donor funding for driving humanitarian innovation include the Humanitarian Grand Challenge or the Humanitarian Innovation Fund (HIF) programme managed by Elrha. The Humanitarian Grand Challenge also serves as a **coordination and accountability mechanism**, where donors report on the progress they have made in regards to accomplishing their humanitarian innovation objectives. Besides, there have been other efforts to **exchange evidence** on different types of innovations to connect humanitarian organisations with tested solutions, such as the matchmaking function provided by the Response Innovation Lab (RIL, n.d.). However, to enable this, relevant evidence and requirements needs to be further standardised (Obrecht & Warner, 2016). The main obstacle to this is that evidence is often not of high quality, that long time periods elapse between monitoring and evaluation and it is becoming usable, as well as the cost of such research (Bryant et al., 2019).

Multiple actors exist in the humanitarian innovation space, the capacities and capabilities of which all differ. **Partnerships within specific innovation projects** can bring new capabilities into the development of a solution, such as creative expertise, technological expertise, access to users, access to funds or a licence to operate. Taking full advantage

of the capacities in the system requires incentives to encourage interaction, collaboration and partnership. Creating such synergy effects can be facilitated by donors through innovation consortia and multi-stakeholder projects.

10.4. Private sector inclusion in the humanitarian field

Partnerships with the private sector are portrayed as key requirements to facilitate humanitarian innovation (Council of the European Union, 2017). While for the longest time, United Nations organisations have been insulated from free market competition, with a relatively small number of NGOs operating in an oligopolistic market with significant barriers to entry, private sector actors are making strides towards developing a significant presence in the humanitarian system (Hoxtell et al., 2015).

Donors, for their part, appreciate private sector involvement because it means lower overhead and less need for constant engagement and monitoring (Sandvik, 2017), as well as the opportunity of leveraging private sector innovation expertise. While initially private actors were an alternative source of funding, in recent years the private sector started to play different roles as well. There are philanthropic contributions from foundations and individuals. Private companies have corporate social responsibility initiatives that connect humanitarianism to their brand. Oftentimes, the profile of some of the private sector actors, such as Google, can help build credibility for products or services launched in humanitarian contexts (Robinson & Obrecht, 2016a). Furthermore, there is a growing number of social entrepreneurs that see pure commercial potential in humanitarian enterprise and to "do well by doing good" (Betts & Bloom, 2014).

However, private sector actors' involvement in the humanitarian space is also seen as entailing potential downsides and risks. The silicon-valley style approach of innovating and "failing fast" can violate the "do no harm" principle and ultimately negatively affect the beneficiaries, who are most likely to bear the costs of the failure (Sandvik et al., 2017). Hence, there remains significant hesitance about whether businesses that seek profit can uphold humanitarian principles (Betts & Bloom, 2014). Also, due to the perceived intention of private sector actors prioritising shareholder value maximisation, there is concern that the affected populations' needs will be neglected. The notion that aid money might be used to pay a return to investors is also sometimes seen as unethical. The increase in private sector activity has furthermore led to a debate on ethics and technical standards, responsible innovation, particularly regarding datafication of vulnerable populations (European Parliament, 2019).

Hence, it is argued that the added value of private sector collaboration to deliver better collective outcomes must be emphasised without compromising humanitarian action or the values of the humanitarian enterprise and that the imperative to provide aid according to need and to do no harm, guided by humanitarian principles, must remain the paramount goal (Fladvad Nielsen et al., 2016).

10.5. Employing Evidence-based approaches

The literature stresses evidence-based approaches as key to making decisions that are realistic and are directed at the right challenges. Without the proper base for information, it is impossible for donors to know whether their funding mechanisms achieve the desired policy objectives. For example, as a result of limited involvement and a "hands-off approach", the Netherlands has failed to adopt a more critical attitude towards the functioning of the agencies receiving

its support and the results they achieve (IOB, 2015). Increased donor involvement may help make data and evidence more widely available in humanitarian settings, which is why the Netherlands and other donors have persistently called on UN agencies to improve their evaluation systems (IOB, 2015). If and how the monitoring and evaluation processes were improved as a result remains unclear. This meta-analytical insight further strengthens the call for common standards and practices and holding innovators more closely accountable to the impact achieved by examining the proof for their value proposition.

10.6.   Improved Financing Mechanisms and Financial Products

Donors, particularly from the public sector, are most frequently mentioned in the literature in the capacity of being the (primary) financier of innovation efforts in the humanitarian sector and thereby the driver of the innovations introduced into humanitarian contexts. Adequate funding is one of the primary enablers of humanitarian innovation. Therefore, improving the effectiveness of the finances contributed by donors is one of the top priorities, stated by both donors and practitioners.

We observe several trends related to novel modes of financing in the humanitarian sector. Firstly, there is an increase of intermediaries who provide innovation funding. Secondly, donor governments are becoming more flexible in their financing processes. Thirdly, donors are administering innovative funding mechanisms by providing pooled and multi-year commitments and leveraging capital market instruments.

Today's humanitarian sector requires flexible and well-coordinated financing instruments and modalities, allowing for quick response and adjustment in emergency and recovery activities, especially in fragile situations (Council of the European Union, 2017). Research by the Humanitarian Innovation Fund (HIF) states that strict funding deadlines could stifle an innovation process, whereas more **flexible approaches** to funding sources supported a successful innovation (Betts et al., 2015). This is an unsurprising finding, nevertheless, grantees cite flexibility by donors as rare. Therefore, donor flexibility is often stressed as a key factor for innovation. Obrecht and Warner (2016), for example explicitly state that their project succeeded only because the donor gave a no-cost extension on a deadline. Yet flexible funding poses certain risks to donors: in some cases, delays on a timeline are necessary to get a prototype right; in other cases, these delays can be the result of mismanagement and poor planning.

Furthermore, **longer-term funding** is called for by innovators, in order to increase reliability and predictability of contributions. This allows recipients to use this funding strategically across their respective mandates to ensure maximum impact with donor funds, scale up sustainable solutions, invest in innovative approaches and adapt to changing situations in emergencies. However, while multi-year financing is extremely popular with recipient practitioners, clear causal effects on improved added value to the affected population is not clearly causally established (Sida et al., 2019).

10.7.   Creating a Conducive Environment for Innovation

The literature repeatedly points out that in order to make the humanitarian system more conducive to innovation, the internal workings of donors and practitioners must become innovative themselves. The lack of "walking the talk" by

donors and practitioners often proves an obstacle to innovation efforts. However, there are increased efforts to foster an innovative culture within organisations, with for example UNHCR stating that: 'Our first agenda item is to expand our efforts to build a stronger culture and set of competencies around innovation' (Earney, 2019). Donors are called upon to create innovative environments and a culture of innovation.

Innovation Competence

New skills and capabilities are needed to cope with the rapidly evolving humanitarian system. According to UNHCR, the staff or a donor government, NGO, or intergovernmental agency such as the UN must be supported explicitly in their effort to implement an innovation approach (Earney, 2019). Many staff are in need of information on resources and support throughout the cycle, not solely in financial terms but also through mentorship, tools and training. For example, GAHI argues that to effectively invest in innovation throughout the entire system, rather than investment in individual innovations, a different kind of investment from funding specific innovators is necessary, and donors must therefore develop the necessary capabilities to adequately perform this type of investment (McClure et al., 2018).

In order to ensure that staff have required skills and capacities, a more concerted investment in staff and training would be necessary, to enable the best available knowledge leveraging and enhancing operations. UNHCR states that its employees need to 'know when, how, and who it takes for innovation to happen. And when they should embark upon an innovation process. They also need the knowledge and expertise to innovate' (Earney, 2019). For instance, USAID provides training and support to all staff in non-permissive environments for incorporating rapid learning, monitoring external contexts and third parties, utilising adaptive procurement, and responding both strategically and tactically as situations change.

Similarly, UNHCR provides increased and pinpointed training initiatives on innovation approaches, matching projects with knowledge transfer around innovation and competency building (Earney, 2019). USAID is attempting to include more appropriate local solutions for innovation by reorganising itself to drive decision-making processes from their local-country offices and in closer collaboration with the national governments. This includes delegating the design of projects and other decision-making to country offices while also increasing collaboration across technical areas and designing cross-sectoral programmes and partnerships (USAID, 2019).

Culture of Innovation

Many organisations, notably UN agencies but also donor governments, face the challenge of building in-house acceptance of innovation activities. Even where innovation is encouraged, field workers often wish to keep their initiatives to themselves rather than sharing what they have learned, for fear of intervention from headquarters (Earney, 2019). However, innovation needs to be encouraged as part of the work of all humanitarians, within a culture of adaptation, change and constant improvement. Such cultural change is a challenge, particularly in large organisations. However, an innovation mindset can be fostered through changes in incentives and practices: opportunities to reflect creatively; dialogue that transcends bureaucratic hierarchies; connecting field and technical staff with headquarters and with one another; secondments within other organisations and sectors; greater human resource mobility across organisations; and encouraging rather than punishing early failure as a means of learning (Balestra, 2019). UNHCR, for instance, acknowledges that 'much of our work is a work in progress, it's about testing, failing, trying again, and strengthening our

resilience muscles. We are confident that, by following the innovation process, through experimentation, small tests and iteration we can hopefully have smaller failures and quicker improvements. create safe spaces to test ideas, cultivate curiosity and a culture that values learning and growth through practice.' (Balestra, 2019). Herein, the biggest responsibility lies with leaders and managers to create that space where people feel comfortable to experiment, safe to take risks and to remove speed bumps in the experimenters' way.

Donor organisations are beginning to review structures and regulations that inhibit innovation, such as barriers to movement into and out of the system to acquire new experiences or skills or procurement rules that limit flexibility to pilot alternative products, processes, or partnerships, particularly with the private sector. For instance, USAID aims to enhance critical technical capabilities regarding innovation by improving its organisational structure and reorganising bureaus and shaping the workforce to create a more field-focused and functionally aligned headquarters that improves efficiency, programmatic coherence, and ultimately enables USAID to more effectively foster self-reliance (USAID, 2019).

10.8.   Humanitarian-Development Nexus Approach

The humanitarian-development nexus is a theme that re-occurs several times, overall in about 5% of the literature surveyed. It constitutes a paradigmatic shift for donors and practitioners from delivering "only" aid as a direct response to crises and towards a more holistic approach. This approach to strengthen the humanitarian development nexus, may present an opportunity to shift the focus of innovation's objectives away from quick-fixes of symptomatic problems and towards addressing underlying root causes and offer system-wide long-term solutions. In the literature, the perception prevails that current modus operandi of the humanitarian system, consisting overwhelmingly of meeting needs immediately following a disaster, are insufficient and resulting in the biassed, inappropriate and expansive management of crisis effects rather than causes. Instead, donors and humanitarian practitioners are called upon to strengthen the transition from relief to development and improve coordination at the nexus of humanitarian action, development assistance, and stabilisation, peace building, and conflict prevention (European Parliament, 2019; Bryant et al., 2019; IASC, 2021; Dalrymple & Thomas, 2021).

According to the literature, this can be accomplished particularly by strengthening operational links between the approaches of humanitarian assistance, development cooperation and conflict prevention, both within individual organisations and across them. For instance, UN agencies and NGOs with mandates encompassing humanitarian and development work were better able to coordinate and adapt programming to address both immediate needs and longer term issues than those with a limited mandate (Dalrymple & Thomas, 2021). Some donors and agencies have internal divisions between their humanitarian and development teams, and only limited systematic internal cooperation.

11. Discussion

The previous sections describe findings from the literature pertaining to the research questions. The findings from the literature imply several shortcomings as to how innovation is approached in the sector. The primary insight is that a more holistic view on the sector is necessary and that current operating modes, which focus largely on the development of singular products and processes, do not lead to the necessary system-wide transformation. Currion, who argues that humanitarian innovation 'as currently structured' is unsustainable, suggests that 'we need to improve the ecosystem' (2019, 44).

In the humanitarian sector, there exist no generally accepted definitions for key concepts surrounding innovation. There is no clear definition for "humanitarian innovation" itself, which makes it difficult to draw a line on what is innovation and what is not. Nor is the meaning of "success" of innovation, the very criterion its significance to the sector should be judged on, defined holistically. Similarly, the concepts of "scale" and "impact", are not clearly defined either. Instead of generally accepted definitions existing in the sector, these concepts are typically defined from case to case basis.

Further, despite the high-priority status that innovation is given in the humanitarian field, there is no generally valid evidence of its positive impact on practices or its added value for affected populations. Indeed, the literature consistently underlines the necessity of creating a larger evidence base, commencing data collection from the early innovation stages, and rigorously applying scientific evaluations to establish the causal impact of an innovation. As a result of shortcomings in reporting, from the evidence that currently does exist, innovations delivered to affected populations as well as innovations used by practitioners and donors are only inconsistently demonstrating increased effectiveness and efficiency of humanitarian practice.

Innovations in humanitarian contexts do not pursue or define a singular common (policy) objective, but rather are pursuing a range of outcomes which are ambitious in both scope and scale. The broad range of objectives may be due to a lack of higher-order coordination, which leads to innovations' objectives being conceived on a case-by-case basis. Further, the ambitious objectives are often being approached in an incremental and piecemeal manner. This is exemplified by the literature reporting a lack of overarching strategies regarding innovations from both practitioners and donors. Symptomatic of this is the fact that most innovations take place at the product or process level and that innovations are overwhelmingly managed on the project (i.e. individual) level. There also exists no generally applied definition of what effects a "successful" innovation actually ought to have. Success criteria often do not evaluate the impact of the intervention and if it is indeed measured, it is typically not through rigorous methods, so no clear causality can be established. The lack of hard evidence, particularly regarding the 'impact' dimension, is also frequently noted in the literature.

The literature lists a number of drivers and obstacles to innovation in the humanitarian context. However, the interrelationships of these factors are often not acknowledged. This is symptomatic of the way in which humanitarian innovation is approached in the sector. Complexities and correlations are insufficiently taken into account in the commissioning, creating, and diffusing of innovation. The major obstacle currently facing humanitarian innovation is a lack of a holistic vision by donors and practitioners. Donors and practitioners must go beyond focussing on singular

innovations or innovation processes to drive innovations throughout the entirety of the sector. A system's perspective is necessary to identify possible levers and intervention points for successful innovation. As stated by the UNHCR Innovation Service, systems thinking can aid in gaining 'perspective of a system from all the different stakeholders to see complexity, situational, perceived degree of order to or interconnections' (Neimand & Christiano, 2020). Taking such a systems-based approach is not only considered beneficial for delivering more effective, efficient, and appropriate solutions to beneficiaries, but also for reforming the humanitarian sector itself by breaking perverse incentives and institutional blockages (Obrecht & Warner, 2016).

From the literature, we perceive the humanitarian innovation system to consist of four components: Output & Performance; Institutions; Actors; and, Contextual Factors.

Component	Description
Output & Performance	The (types of) innovations resulting from the system, and the degree of "success" they achieve (e.g. in terms of scale and impact).
Institutions	The formal and informal habits and practices, or routines shaping the way things are done within the system and how they inhibit or encourage innovation.
Actors & Relationships	The various actors within the system, the roles they play in driving innovation, their relationships, networks, and interactions.
Contextual Factors	Factors, both external and internal to the system, that have an effect on the humanitarian innovation system and may cause it to change.

Table 6. Components of the Humanitarian Innovation System.

For the remainder of the discussion section, we frame the preeminent recommendations for improving the humanitarian system based on these four components. To this end, the main findings and themes identified are briefly outlined, in order to contextualise the recommendations. Firstly, we will concentrate on the **output and performance** of the system introducing innovations to be used by affected populations, donors, and practitioners. Secondly, we discuss the innovation system's **institutions**, which dictate the capacity to deliver needs-based solutions, which we conceptualise as a function of the financing mechanisms, use of evidence, the donor and institutional support, and the upholding of ethical principles. Thirdly, we analyse the forming and shifting of **relationships between actors**, such as a perceived push to increased collaboration between donors, NGOs, and intergovernmental organisations, more explicit inclusion of the local population in the innovation process and the inclusion of the private sector in the humanitarian field. Lastly, we explore the evolution of the humanitarian sector as a result of **contextual factors** such as technological development, nexus approaches, and attempts to create more conducive environments for innovation from the inside out.

11.1. Output and Performance

The literature is consistently vague on the output and performance of humanitarian innovation. From the evidence that does exist, innovations delivered to affected populations as well as innovations used by practitioners and donors are not consistently demonstrating to be increasing the effectiveness and efficiency of humanitarian practice. Further, innovations frequently fail to scale to a significant number and the impact achieved by innovations is unclear. This is in large part due to a lack of **conceptual clarity** regarding a number of key concepts such as the definition of innovation, the objectives of innovation, or what makes an innovation successful.

In the literature, multiple **types of innovation** are described, especially along the lines of the "4Ps" (plus their extensions). The innovation types most frequently implemented in the sector are of the product and process type. Product and process innovation tend to be incremental in nature, as they are typically based on 'dominant designs' of existing products and processes. Further, the focus on products and processes provides an overly narrow perspective as it disregards how these innovations would also require users to meet certain operational capabilities or contextual requirements to become successful. This narrow perspective on the product and process level is also a driver of technophilia, with digital technological innovations making up the majority of innovations newly introduced to the humanitarian sector. Therefore, it is critical to move beyond mere classifications of innovations according to their types, and instead acknowledge the business strategies that they imply in order to become successful.

Innovations are developed to serve two types of **end-users**. In terms of concrete outputs, we find that innovations are either directed at beneficiaries or implementers. The literature describes that most innovations are directed towards practitioners and donors, meaning the majority of innovations does not end up being used by the affected population. This is primarily due to the innovators catering to the desires of the donors, who are their customers. Such a focus on innovation for practitioners and donors seems to be counterintuitive for creating more local engagement, capabilities, and strengthening local actors.

Furthermore, the literature recognises that donors must approach innovation from a more holistic point of view, beyond singular products and processes. A **systems perspective** allows us to see more clearly what other types of innovation might be required and which contextual factors could be met to put innovation to use (i.e. adoption and scalability criteria). Such a perspective can further aid in ensuring certain trends (broader than singular products and processes) are effectively leveraged for a systems transformation. Also, the literature repeatedly points to the necessity that in order to meet transformational targets (such as localisation), it is important to take into account the voice of beneficiaries and develop innovation outputs that are more user-centric.

Strategic & Policy Recommendations

1. Increase coordination and alignment in the humanitarian sector around the role of innovation ensuring consistent use and application of key concepts:
    1.1. Reconceive the role or innovation (meaning its definition and objective in the humanitarian sector) so that a common language is used and clear common goals are defined;

1.2. Determine how success is defined and measured, both on a case-by-case basis and on a higher level in relation to policy objectives;

1.3. Provide clear objectives for innovation in terms of impact, scalability and transferability;

2. Promote and apply a systems perspective towards the role of innovation in achieving desired transformational targets within the humanitarian sector:

2.1. Ensure that innovation is focussed on key challenges and transformative targets, and consider how innovation can and should contribute in realising these;

2.2. Encourage innovators and donors to move beyond a focus on products and processes;

2.3. Start new developments with the context and end-users in mind, and when transferring existing innovations to the humanitarian setting identify the specific user and context requirements.

11.2. Institutions

Institutions are understood as "regularities of behaviour" that are largely historically determined and have close linkages to culture. They are formal and informal rules shaping roles, relationships, resource allocations, and innovation processes and how people (or organisations) behave in certain circumstances. Institutions can therefore be understood as making up the "operating mode" of actors within the humanitarian system.

Different levels of **innovation management strategies** are acknowledged in the literature. However, these strategies mostly are on the level of individual projects. Programme and portfolio-level analyses are rare and system-level management practices barely exist. This limits the opportunities to study humanitarian innovations from a comparative- or systems-level perspective and hence to develop a more holistic understanding for how innovation should be managed.

Evidence-based approaches are not the ground for decision making. Humanitarian innovation rests on the assumption that innovation improves the quality and impact of humanitarian responses; however, very little generalisable evidence has tested this. The literature lacks focus on assessing the impact of innovation in terms of the quality, efficiency and effectiveness of humanitarian responses and outcomes for people in crises. This is also manifested in which innovations get funded. Rather than funding concepts or prototypes based on evidence-bases, innovations are funded based on perception and donor preference. This lack of data-driven decision making also adds a level of arbitrariness to which innovations receive funding for being scaled up, as there is no way of telling whether they are "successful" due to a lack of common standards and data. Innovations therefore rarely reach scale.

The evidence base also brings up the question how routines for measurement and evaluation are linked to **resource allocation**, specifically as to whether the (potentially) most impactful innovations are indeed being funded. Indeed, donor and institutional support is unevenly distributed across different types of innovations and throughout the innovation phases, with a preference for allocating funding to technological innovation and early innovation stages (i.e. prototyping and piloting). Due to a lack of funding, many pilots are nor formally or independently evaluated, which may explain the lack of funding for later innovation stages. This also creates a fundamental obstacle for innovations to achieve scale and become sustainable.

Adequate **funding** is seen as a primary enabler of humanitarian innovation. Although donors have increasingly made available targeted funding and opportunities for supporting innovation through core funding, there remains a critical gap in terms of the amount and longevity of funding. With regards to innovation, this implies higher uncertainty for innovators because the funds received will be allocated according to yearly budgets, rather than via multi-year agreements. The issue may also arise from the way funding appeals are structured, with for instance the funding appeals being context-specific, meaning that it is only committed to a specific crisis or type of support. Higher uncertainty and fewer opportunities in turn will lead to fewer innovation projects being undertaken in the first place, and the ones which are indeed launched have a higher risk of failing due to lack of funds.

The **market constellation** in the humanitarian sector differs in many ways from private sector markets, as the donors are the primary customers of innovation, not the affected populations. Hence, negative user experience is far less likely to result in the discontinuation of an innovation, as long as the donors remain willing to fund the information. This donor push of innovation may result in less effective, efficient, and appropriate innovations.

Upholding **ethics and principles** is proving challenging when introducing innovations, particularly technological ones that constitute a tradeoff between increased efficiencies and privacy. Additionally, the high uncertainty surrounding innovation projects and the difficulty in predicting costs and benefits ex-ante prove a difficulty in weighing which option to pursue between a high-risk, high-reward innovation and low-risk, low-reward options. Further, the introduction of non-traditional actors into the humanitarian space, especially from the private sector, causes concern regarding the introduction of a profit motive into humanitarian contexts, which could violate the humanitarian mantra of 'do no harm'.

Strategic & Policy Recommendations

3. Decision-making for investing in innovation needs to be more rigorously based on data and evidence, according to one or more of the following perspectives:
   3.1. Support innovators to define 'objective' performance measurement related to defined (policy) objectives, to assess whether it outperforms current practices on indicators of cost, output, outcome, or quality;
   3.2. Include feedback from primary beneficiaries and end-users to ensure that innovations meet their needs and priorities;
   3.3. For innovations in the middle of the process, request consolidated lessons from the process to date or, if relevant, an evaluation from a previous phase of the process, and ask how lessons are being built upon;

4. Monitoring and evaluation efforts along the entire innovation journey must be increased by practitioners. Donors are recommended to comprehend and retrace the monitoring and evaluation outcomes conducted by the practitioners:
   4.1. Introduce common standards and practices for holding innovators more closely accountable to the impact achieved by examining the proof for their value proposition;
   4.2. Share case studies and insights thereby building on hands-on experience;

4.3.   Research and publish how many innovations that receive funding and technical support at early-stage progress achieve scale;

4.4.   Conduct more cross-portfolio impact evaluations, particularly looking at the impact of innovations over time;

5. Employ improved financing mechanisms and financial products to fund innovation more effectively in the humanitarian sector:

5.1.   Move beyond investing in individual innovations towards funding capabilities to adequately perform this type of investment (through investing in intermediaries managing innovation at programme or portfolio level);

5.2.   Provide adequate financial support to fund the follow-through of innovation in order to ensure that these can achieve scale and become sustainable;

5.3.   Provide alternative and flexible forms of financial aid (e.g. multi-year funding, pooled funding) to encourage humanitarian innovation projects by providing sustained and plannable financing;

6. Circumvent the issues arising from the setup of the complex market constellation in order to decrease focus on innovations catering to needs of donors instead of practitioners and affected populations:

6.1.   Provide incentives for humanitarian innovation to cater more explicitly to benefit the affected population, rather than 'just' the donors;

6.2.   Encourage and support innovators to generate alternative income streams, outside of grant of core funding, to develop sustainable business models for supporting innovations;

6.3.   Provide dedicated funding to support the diffusion and transfer of innovation in order to ensure that innovation moves beyond initial innovation stages and scales sustainably;

7. Encourage principled and responsible innovation in order to mitigate the risks associated with innovation and experimentation:

7.1.   Mitigate the risk in high-risk projects by asking innovation teams to conduct risk assessment together with end-users and conduct a review of existing approaches and solutions in their early funded activities;

7.2.   Upholding ethics and humanitarian principles by ensuring adherence to humanitarian principles, and acknowledging potential trade-offs between the risk of failure of innovation and the value for money it delivers;

7.3.   Invest in increased sharing of best practices and lessons learned, as well as the development of concrete tools and guidance to support improved innovation management practices.

11.3.   Actors & Relationships

Strategic approaches to conceiving and implementing ways to strengthen parts of the humanitarian innovation system have started to emerge. Cooperation among practitioners in the form of capacity sharing, utilising intermediaries as expert-led drivers of innovation, and exchange of best practices have been a key area of focus and these initiatives provide expertise for supporting innovation efforts. Partnerships with local actors are seen as key to successful innovation, as they improve the appropriateness of an innovation to the local context. Lastly, it is acknowledged that the private sector can contribute by leveraging its innovation expertise to amplify the innovation efforts of the humanitarian sector.

Increased **collaboration between donors**: An increased integration of humanitarian actors' funding, data sharing, and coordination is recognised in the literature as essential for supporting innovation in the humanitarian sector. This process has already made great strides, with initiatives such as the Grand Bargain. However, the literature points to the need for further intertwinedness of approaches and initiatives.

Collaboration in the humanitarian sector does not only include donors, but **multiple stakeholders** such as donors, innovators and practitioners, as well as the private sector. Such collaboration is driven by donors, international organisations, civil society, and national authorities collectively addressing key humanitarian challenges. The aim of such collaborations is the creation of synergetic effects through complementary skill sets and areas of responsibilities. The inclusion of the private sector is also commonly noted in the literature. There is a discussion regarding finding a balance between leveraging private sector expertise and resources on the one hand and staying unequivocally firm on humanitarian principles on the other.

Inclusion of the local population in the innovation process: The literature notes both the necessity and the increased efforts of a more inclusive user-centric approach regarding the role of the affected population in the context of humanitarian innovation. This is seen as necessary for increasing the appropriateness of the innovation design as well as building capacity and resilience of the local population.

Cooperation through **intermediaries**. Intermediaries are increasingly acting as brokers, facilitating the open exchange of new information, knowledge and technological invention between 'seekers' and 'solvers' of challenges in the humanitarian context. These intermediaries also play a role in allocating funding to individual innovation projects while encouraging management at a programme or portfolio level.

Strategic & Policy Recommendations

8. Develop collective donor approaches aimed at increasing collaboration, coordination, knowledge exchange and bundling of resources within the sector:
    8.1.   Work collectively as donors to develop strategic approaches that outline desired impacts and outcomes for supporting innovation action across humanitarian projects, programming, portfolios, and systems to create the right incentives for change;

8.2.   Work together amongst donors and other stakeholders in defining shared agendas and initiatives for innovation as well as sharing of best practices and evidence on innovation from a systems perspective;

8.3.   Harmonise and simplify monitoring and reporting requirements and timeframes across donors, for example through common reporting templates, to simplify exchange of best practices and avoid practitioners needing to report on their innovation efforts in a myriad different ways;

8.4.   Actively engage as donors in innovation activities with the development of in-house capabilities;

9. Facilitate collaboration and alignment between innovators, humanitarian organisations and private sector actors:

9.1.   Provide platforms for knowledge exchange, networking and communities of practice around key humanitarian challenges to serve as incubators for identifying problems in a way that cultivates ownership and generates momentum to address these problems;

9.2.   Build strategic partnerships between donors, international organisations, civil society, and national authorities focused on collectively addressing key humanitarian challenges;

9.3.   Encourage matchmaking between innovators and humanitarian organisations to ensure adoption and transfer of tested solutions;

9.4.   Consider what to adopt/adapt from the for-profit innovation architecture and how to involve private sector actors without sacrificing humanitarian principles;

9.5.   Enter partnerships with the private sector to leverage innovation capabilities and resources;

10. Ensure active participation and inclusion of affected populations in innovation agendas and processes:

10.1.   Invest significantly in innovations driven by the participation of affected people, including those based on the ideas of affected people from recognition all the way to diffusion.

10.2.   Encourage collaboration with local and marginalised communities to ensure innovations are appropriate and empower these communities. The inclusion of the affected population throughout the different stages of the intervention leads to more effective and appropriate innovations while also making use of local systems and expertise, building innovations from the bottom-up;

10.3.   Support and align with existing country-level strategies on innovation to support national and local actors in their efforts to drive bottom-up innovation and capacity building, and monitor and evaluate donor-funded efforts against these strategies;

11.4.   Contextual Factors

The previously outlined components of the humanitarian innovation system outline the status quo of its outputs, actors, and institutions. This section describes what we call "contextual factors", which cause the system to change. The

innovation system constantly evolves due to internal processes as well as pressures from other co-evolving systems. Drivers are for instance the continuous development of novel technologies developed outside the humanitarian sector, which can also be applied in humanitarian contexts. Internal drivers are an increased interlinkage between humanitarian-development-peace approaches and an improved innovation capability of the humanitarian actors.

Technological Development: A number of articles are pointing to technological development as a main driver to humanitarian innovation. Many novel technologies are not specifically developed for the humanitarian sector, but are nevertheless adopted and adapted by both practitioners and affected populations. Technological development has pushed considerable changes in the humanitarian system leading to the introduction of new products and processes, as well as entirely new ways of working. Simultaneously, it sets considerable challenges for organisations and individuals in managing these technological and digital transformations.

Humanitarian-Development Nexus Approach: The humanitarian sector is increasingly recognising that its current operating mode insufficiently deals with the root-causes of crises related to countries' (economic) underdevelopment. Therefore, the humanitarian sector is being reshaped by the demand to more closely link humanitarian and broader development initiatives and addressing root causes of vulnerability, fragility, and conflict. The increased attention towards a Humanitarian-Development Nexus approach causes the elements of the system to evolve, with the pursued outputs including broader economic development, development actors entering the system, and institutions being re-shaped to have a longer-term perspective.

Creating a Conducive Environment for Innovation: Another driving force causing evolution within the sector is the drive by the donors and practitioners within the system attempting to re-shape the system from the inside-out and make it more conducive to innovation. This implies an increase in capabilities and a reform of culture of the actors. The humanitarian sector is evolving and increasingly attempting to become a more fertile environment for innovation. This approach towards more open innovation, more interaction between actors, and a culture of innovation results in a change in outputs (more, higher quality), actors (different type of personnel and more innovation capabilities), and institutions (becoming more entrepreneurial and professionalising innovation management practices).

Strategic & Policy Recommendations

11. Take advantage of technological developments for transferring solutions towards the humanitarian sector, while maintaining a critical stance towards the potential and role of new technologies;
    11.1. Develop a holistic approach, which goes beyond perceiving new technologies solely as products and processes, but also acknowledge the necessity of infrastructural requirements and capabilities for operation and management;
    11.2. Make sure that funding of technological innovation is based on evidence-based approaches, and does not receive preferential treatment over other types of innovation;
    11.3. Make sure that the risks and ethical challenges resulting from the introduction of new technologies are adequately addressed;

12. Conduct a fundamental review of the role of innovation in operationalising a Humanitarian-Development nexus approach:

    12.1.   Donors should adopt a comprehensive strategy for innovation across their humanitarian assistance and development cooperation portfolios to ensure innovation strategies are complementary and mutually reinforcing;

    12.2.   Encourage innovators to address root causes instead of symptoms of humanitarian crises;

    12.3.   Invest in innovation in humanitarian and disaster-prone context to support innovation aimed at increasing resilience and the transition to development from the early stages in a predictable manner and orient their response to encompass resilience-building activities;

13. Provide a conducive environment for innovation through fostering innovative cultures within organisations and required competencies:

    13.1.   Foster in-house acceptance and understanding for innovation activities within humanitarian organisations, but also donors;

    13.2.   Support the development of resources and support, not solely in financial terms, but also through mentorship, tools and training;

    13.3.   Invest in intermediaries to support humanitarian organisations in developing innovation expertise and facilitating open exchange of best practices and lessons learned;

    13.4.   Review structures and regulations that inhibit innovation, such as barriers to movement into and out of the system to acquire new experiences or skills or procurement rules that limit flexibility to pilot alternative products, processes, or partnerships, particularly with the private sector.

12. Conclusion

Humanitarian innovation is not pursued for its own sake: it is meant to lead to substantial improvements in the provision of humanitarian assistance for the benefit of crises affected and crises vulnerable populations. Yet, there is little evidence on the relationship between innovation and humanitarian performance, resulting in ongoing questions as to whether innovation activity is actually leading to improvements in humanitarian action. The literature study explored a number of questions related to the concept of humanitarian innovation, both to enhance conceptual clarity and explore factors enabling successful innovation. Specifically, the report answers research questions regarding how humanitarian innovation is defined, as well as what strategies are used to implement it. Further, the study attempts to define what makes an innovation successful, identify successfully implemented innovations from the literature, and analyse their scalability and transferability as well as drivers and obstacles to their delivery. Moreover, the report synthesises avenues for donors and policymakers to contribute to the promotion of humanitarian innovation. In pursuing these objectives, the literature study provides an evidence base to inform Dutch policy discussions and decision-making.

Through the use of the systematic literature review methodology coupled with narrative synthesis, this study provides a comprehensive overview of the state of the art of humanitarian Innovation, analysing 301 articles from both academic and grey literature We have compiled a number of findings to answer the research questions and beyond. A key takeaway from the study is that many of the concepts frequently occurring in the humanitarian innovation literature are applied non-uniformly and need clearer definitions. Tellingly, the very definitions of humanitarian innovation are highly varied, applying different focus levels (outcome-based, process-based, system-based etc.) and from being extremely general to very granular.

From our systematic review of the literature on humanitarian innovation, the primary insight is that a more holistic view on the sector is necessary. We therefore develop an innovation ecosystem approach, which brings together our findings. This framework presents humanitarian innovation in a systems perspective, constituting several components. Firstly, the outputs of humanitarian innovation, i.e. the actual innovations developed and implemented by the multitude of actors active in the system, be they products, processes, positions, paradigms, or policies. The second component of the system is the system's internal capacities, referring to competencies and capabilities derived from the approaches and strategies employed. Thirdly, the actors within the system and how their relationships develop and shift, and how this affects the other components of the system through knowledge sharing and diffusion. Lastly, the contextual factors of the system, referring to internal and external forces that lead to the system changing, for instance due to the development of new technologies in other, neighbouring systems.

Such a conceptualisation can help policymakers better understand the complexities and interrelationships operating within the system – to see that piecemeal solutions and the introduction of some of the latest trends in the innovation management literature are unlikely to be as effective as hoped, outside of a systemic picture of how innovation works in practice. Further, for policymakers, an understanding of the innovation system can help identify leverage points for enhancing innovative performance and overall competitiveness. It can assist in pinpointing mismatches within the system, both among institutions and in relation to government policies, which can thwart technology development and

innovation. It is furthermore necessary for the sector to discontinue focusing on individual technologies or solution designs as silver bullets, and instead reinvent itself and develop and put to use the capacity to respond to challenges in the humanitarian sector

We recognise that each component of the framework will require more research to obtain an in-depth and granular understanding of humanitarian innovation. However, there are important lessons that the research has identified, which provides confidence that an ecosystem approach can provide crucial pointers for both practitioners and policymakers in the sector.

The findings strongly suggest that without a clear and shared understanding of what humanitarian innovation is and for what it is needed, the how and where of humanitarian innovation will likely remain vague, obscured and difficult to formalise. Therefore, future research needs to endeavour further clarification regarding the key concepts around humanitarian innovation.

An increased emphasis on researching innovation in the humanitarian context on a system level can lead to clearer conceptualisations as to how innovation can lead to transformative and system-wide change in the sector.

Future Research

The components of the humanitarian system identified in this report can be used as a framework to guide future research on the humanitarian innovation system. As such, it could support moving beyond project-level approaches for managing innovation in the humanitarian sector. While the system concept has proven useful for exploring innovation in the humanitarian area, we have also identified a number of shortcomings, especially in translating the high-level constructs of the system approach into workable guides for policy making

To enable this, future research should prioritise conducting a detailed analysis of the humanitarian innovation system. This could be done along the lines of the 6Rs framework, as proposed by Ramalingam et al., (2021) exploring the different relationships and interactions between different components. Besides, as there is an apparent gap in the literature, it is critical to further assess how innovation takes place across different humanitarian contexts, which contexts enable or hinder innovation, as well as how the humanitarian innovation ecosystems could interact with other ecosystems such as the development sector.

Further, while there appears to be strong evidence suggesting that local actors and communities are uniquely positioned to innovate in ways that are relevant, effective and culturally and contextually appropriate, localised humanitarian innovation still appears to be under-researched and lacking practical guidelines. The interlink of innovation and localisation should therefore be researched in greater detail. This particularly relates to exploring more closely how knowledge transfer in local contexts is created and fostered, and more broadly how capacities can be built up in crisis contexts.

Lastly, it is of importance to take a broader lens towards innovation and study the process of how innovation at lower levels (i.e. product/process) can lead to higher-level changes such as position or paradigmatic innovation (e.g. in the ways

we work, our attitudes and ethics). This also allows to develop a broader understanding of the role of innovation in realising more transformative ambitions and system's change within the humanitarian sector.

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14. Annex 1: Methodology

The label "systematic literature review" is an umbrella term, covering a variety of techniques whereby existing theory (or theories) and evidence can be evaluated or explored deploying replicable, scientific and transparent protocols. For the present work, we feel that the appropriate specification is the "narrative synthesis" technique.

Narrative methods of synthesis can be used to synthesise both quantitative and qualitative studies and have been used when studies included in a systematic review are not sufficiently similar for a meta-analysis to be appropriate. Unlike meta-analyses, which aim to convert information into a common metric and synthesise the data to test a theory using statistical methods, the narrative synthesis aims to synthesise data qualitatively. This allows the narrative synthesis methodology to go beyond the binary question of "what works" and explore in-depth what works, as well as what does not, how, why, and for whom – synthesising findings from diverse, multiple studies whose insights are oftentimes mainly textual in nature. The objective is to build the narrative or 'tell the story' through synthesis of the findings of diverse texts in response to the central research queries.

An inductive approach was adopted, whereby we started with the central research queries and built theories and narratives to explore and answer them iteratively while constantly validating and refining our findings with new data. The methodology follows the standard steps in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) statement and will be rigorous, transparent, and replicable. The following figure summarises the methodology (Prisma Statement, n.d.).
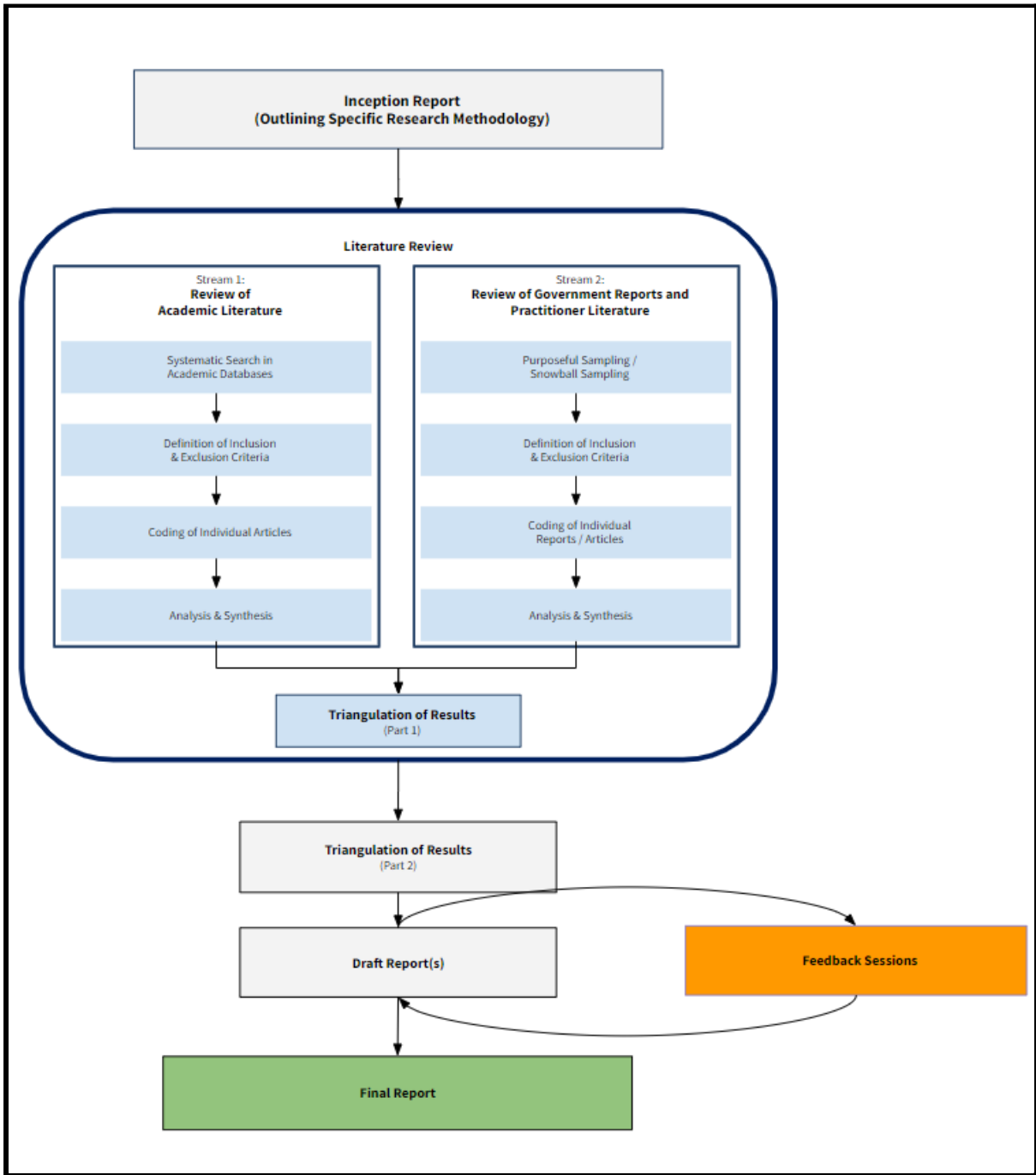
Figure 4. Systematic Literature Review (methodology)

For academic literature, first, a comprehensive search is performed in the standard bibliographic databases such as SCOPUS, Web of Knowledge, and Google Scholar. The search on these three databases using the key term "humanitarian innovation" or "humanitarian" <u>and</u> "innovation", from the years 2015-2021, yielded 1846 results.

	SCOPUS	Web of Knowledge	Google Scholar

URL	www.scopus.com	www.webofknowledge.com	https://scholar.google.com/
Search Term / Rule	TITLE-ABS-KEY (humanitarian AND innovation) AND (LIMIT-TO (PUBYEAR , 2021) OR LIMIT-TO (PUBYEAR , 2020) OR LIMIT-TO (PUBYEAR , 2019) OR LIMIT-TO (PUBYEAR , 2018) OR LIMIT-TO (PUBYEAR , 2017) OR LIMIT-TO (PUBYEAR , 2016) OR LIMIT-TO (PUBYEAR , 2015))	TS= (humanitarian AND innovat*) Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=2015-2021	"humanitarian innovation" FROM 2015
Number of Results	330	446	1070

Table 7. Search Queries for Key Databases

From the initial results, we eliminated all articles published before 2015, as well as all duplicates, thereby excluding 981 articles. Following, we eliminated 158 articles for lack of impact, meaning they had fewer than five citations. We did this, however, only for articles published before 2020 in order to not eliminate recently published impactful articles, which are simply too recent to have already been cited widely. For the remaining 707 articles, we screened the titles and abstracts and included all articles matching our inclusion criteria, which we drew directly from the research questions i.e. include the article if it:

- Defines Humanitarian Innovation
- Outlines Implementation Strategies
- Gives concrete examples of innovations
- Defines Success / Failure of Innovation
- Gives examples of drivers and obstacles
- Explains the role of donors

Any article not corresponding to the inclusion criteria was disregarded. The articles were falsely included in the preliminary sample due to one of five exclusion criteria:

- **Non-valid formats** (e.g. letters, Master Theses, Entire books, lectures, course descriptions)
- **False positive (humanitarian)**: Meaning of the world 'humanitarian' ≠ 'the sector' (i.e. it describes a sentiment, or a subset of health care, etc.)
- **False positive (innovation)**: 'innovate' or 'innovative' or 'innovation' is mentioned as a passing reference/use of an adjective/ innovation, non-specific.
- **Concept mismatch**: While the terms "humanitarian" and "innovation" are both occurring in the article, they are not used in combination as "humanitarian innovation"
- **Method mismatch**: Has no humanitarian application (e.g. biographical or related research whose product is journalistic or historical).

The abstract screening eliminated a further 507 articles, leaving us with exactly 200 articles from academic databases for full text review. From these, we further rejected 66 articles in accord with our inclusion and exclusion criteria.

Further, we gathered data from grey literature, focusing on documents from the government, social sector actors and humanitarian agencies not found in academic databases. As there is no comprehensive centralised database for these types of practitioner literature, a purposive sampling approach was applied. Relevant documents were gathered from a number of key sources (e.g. Reliefweb, The New Humanitarian, ALNAP, Elrha, Humanitarian Innovation Fund, Dutch Coalition for Humanitarian Innovation, The Humanitarian Practice Network, individual donors, UN agencies etc.). The grey literature sources were compiled by leveraging the knowledge of the MFA, the research team itself, and an expert interview. Overall, we considered 303 articles from the grey literature for data extraction.

Third, the 503 articles making up the final corpus were read in full and coded, i.e. categorised, according to how they respond to the central research queries. If upon full reading it was determined that they were unsuitable to answer the research questions, they were eliminated from consideration. Through this, another 202 articles were eliminated, bringing the final count of articles used as basis for analysis to 301. For these, protocols for coding were built as open protocols. iteratively through discussion until consensus is reached. We conducted the coding on two levels - level one was what we termed the "article level", meaning we coded information stemming from the entire article (including the articles literature review). This ensures the coverage of significant breadth of the available literature. The second level we termed the "innovation level" and we only coded information pertaining to this level if the article went into significant detail on a specific (or multiple) innovation(s), in order to ensure analytical richness. The innovation level coding ensures the necessary depth in analysing individual innovations and their characteristics. The code book with the specific coding categories and their explanations can be found in the appendix.

Fourth, once the coding was complete, we inferred our preliminary results. These are both in the form of frequencies of recurring patterns and the foundations of narratives to answer the research queries, as well as a comprehensive framework capturing the insights gained.

Annex 2: Corpus of Literature

Note - the order of the articles comprising the corpus is not alphabetical, but rather in the order in which the outputs were generated through the search methodology.

No.	Author	Title	Year	Journal	DOI	Link
1	Schmitt M.L., Wood O.R., Clatworthy D., Rashid S.F., Sommer M.	Innovative strategies for providing menstruation-supportive water, sanitation and hygiene (WASH) facilities: learning from refugee camps in Cox's bazar, Bangladesh	2021	Conflict and Health	10.1186/s13031-021-00346-9	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85101750522&doi=10.1186%2fs13031-021-00346-9&partnerID=40&md5=ad36415aa8455980c339a46edb148c0a
2	Rush H., Marshall N., Bessant J., Ramalingam B.	Applying an ecosystems approach to humanitarian innovation	2021	Technological Forecasting and Social Change	10.1016/j.techfore.2020.120529	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85099246846&doi=10.1016%2fj.techfore.2020.120529&partnerID=40&md5=fcd0f46cc74cd934b00da19b0b1d3bda
3	Lovey T., O'Keeffe P., Petignat I.	Basic medical training for refugees via collaborative blended Learning: Quasi-Experimental Design	2021	Journal of Medical Internet Research	10.2196/22345	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85103551839&doi=10.2196%2f22345&partnerID=40&md5=aed0a83ba1739695d8e9dc7244dc15f3
4	Munyuzangabo M., Gaffey M.F., Khalifa D.S., Als D., Ataullahjan A., Kamali M., Jain R.P., Meteke S., Radhakrishnan A., Shah S., Siddiqui F.J., Bhutta Z.A.	Delivering maternal and neonatal health interventions in conflict settings: A systematic review	2021	BMJ Global Health	10.1136/bmjgh-2020-003750	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85101194672&doi=10.1136%2fbmjgh-2020-003750&partnerID=40&md5=2ec5334415822ac826d393241e806961
5	Fekete A., Bross L., Krause S., Neisser F., Tzavella K.	Bridging gaps in minimum humanitarian standards and shelter planning by critical infrastructures	2021	Sustainability (Switzerland)	10.3390/su13020849	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85099805413&doi=10.3390%2fsu13020849&partnerID=40&md5=bffb55bd875da5e5de931a9f6e8da5af
6	Prasanna S.R.	The role of supplier innovativeness in the humanitarian context	2021	Annals of Operations Research	10.1007/s10479-021-04065-5	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85104156498&doi=10.1007%2fs10479-021-04065-5&partnerID=40&md5=63d2ed2c056ad71e420c9dc14102572d

7	Kovács G., Falagara Sigala I.	Lessons learned from humanitarian logistics to manage supply chain disruptions	2021	Journal of Supply Chain Management	10.1111/js cm.12253	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85099379456&doi=10.1111%2fjscm.12253&partnerID=40&md5=fb79cc466291a99b91ba09b35c7f0a0d
8	Jutel O.	Blockchain imperialism in the Pacific	2021	Big Data and Society	10.1177/2 05395172 0985249	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85101294195&doi=10.1177%2f2053951720985249&partnerID=40&md5=b8c49901bf9ce3bdef4855f49961e637
9	García-Orosa B., Pérez-Seijo S.	The Use of 360° Video by International Humanitarian Aid Organizations to Spread Social Messages and Increase Engagement	2020	Voluntas	10.1007/s 11266-020 -00280-z	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85094170082&doi=10.1007%2fs11266-020-00280-z&partnerID=40&md5=73ef313af658d7288f10df58118e9671
10	Gaffey M.F., Ataullahjan A., Das J.K., Mirzazada S., Tounkara M., Dalmar A.A., Bhutta Z.A.	Researching the delivery of health and nutrition interventions for women and children in the context of armed conflict: lessons on research challenges and strategies from BRANCH Consortium case studies of Somalia, Mali, Pakistan and Afghanistan	2020	Conflict and Health	10.1186/s 13031-020 -00315-8	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85092924839&doi=10.1186%2fs13031-020-00315-8&partnerID=40&md5=12dbaefe752eccbeb10169b30bfc824e
11	Sahebi I.G., Masoomi B., Ghorbani S.	Expert oriented approach for analysing the blockchain adoption barriers in humanitarian supply chain	2020	Technology in Society	10.1016/j. techsoc.2 020.10142 7	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85092715845&doi=10.1016%2fj.techsoc.2020.101427&partnerID=40&md5=6f869712419df9cbb247339e86d2cb27
12	Hossain M.K., Thakur V.	Benchmarking health-care supply chain by implementing Industry 4.0: a fuzzy-AHP-DEMATEL approach	2020	Benchmarking	10.1108/B IJ-05-202 0-0268	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85092603733&doi=10.1108%2fBIJ-05-2020-0268&partnerID=40&md5=23083a08b8d4b69d7de480d65b1379d8
13	Talhouk R., Coles-Kemp L., Jensen R.B., Balaam M., Garbett A., Ghattas H., Araujo-Soares V., Ahmad B., Montague K.	Food Aid Technology: The Experience of a Syrian Refugee Community in Coping with Food Insecurity	2020	Proceedings of the ACM on Human-Computer Interaction	10.1145/3 415205	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85094182423&doi=10.1145%2f3415205&partnerID=40&md5=af93b4f8608d197fea1f62f8a8550434

14	Bounie D., Arcot J., Cole M., Egal F., Juliano P., Mejia C., Rosa D., Sellahewa J.	The role of food science and technology in humanitarian response	2020	Trends in Food Science and Technology	10.1016/j.tifs.2020.06.006	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85088842256&doi=10.1016%2fj.tifs.2020.06.006&partnerID=40&md5=804a8fc6160cb7203300cab970859d9b
15	Saleh S., El Arnaout N., Abdouni L., Jammoul Z., Hachach N., Dasgupta A.	Sijilli: A scalable model of cloud-based electronic health records for migrating populations in low-resource settings	2020	Journal of Medical Internet Research	10.2196/18183	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85089615350&doi=10.2196%2f18183&partnerID=40&md5=f317a961d6fa0a9f8cea8540bc841eaf
16	Krishnan S.	Humanitarian WASH (water, sanitation and hygiene) technologies: exploring recovery after recurring disasters in Assam, India	2020	Disaster Prevention and Management: An International Journal	10.1108/DPM-02-2019-0051	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85087148229&doi=10.1108%2fDPM-02-2019-0051&partnerID=40&md5=73b88da4c9e183f004b875e35007a811
17	Ambrus D., Vasic D., Bilas V.	Innovating on top of im fundamentals for safer humanitarian demining	2020	IEEE Instrumentation and Measurement Magazine	10.1109/MIM.2020.9082797	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85084755337&doi=10.1109%2fMIM.2020.9082797&partnerID=40&md5=65baddc028180ccfff51552e6358ec47
18	Jones L., Ballon P.	Tracking changes in resilience and recovery after natural hazards: Insights from a high-frequency mobile-phone panel survey	2020	Global Environmental Change	10.1016/j.gloenvcha.2020.102053	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85082566976&doi=10.1016%2fj.gloenvcha.2020.102053&partnerID=40&md5=49b8c9fa8550a9cd7c3db2bc89f4b5ab
19	Jeong H.Y., Yu D.J., Min B.-C., Lee S.	The humanitarian flying warehouse	2020	Transportation Research Part E: Logistics and Transportation Review	10.1016/j.tre.2020.101901	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85081269519&doi=10.1016%2fj.tre.2020.101901&partnerID=40&md5=2a572cf6f16636c3d15df9501f3229ae
20	McGowan C.R., Baxter L., Deola C., Gayford M., Marston C., Cummings R., Checchi F.	Mobile clinics in humanitarian emergencies: A systematic review	2020	Conflict and Health	10.1186/s13031-020-0251-8	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85079284014&doi=10.1186%2fs13031-020-0251-8&partnerID=40&md5=b7154290720202114151e63e953e116c

21	Spiegel P., Chanis R., Scognamiglio T., Trujillo A.	Innovative humanitarian health financing for refugees	2020	Health Policy and Systems Responses to Forced Migration	10.1007/9 78-3-030- 33812-1_3	https://www.scopus.com/inward/record .uri?eid=2-s2.0-85088443597&doi=10.10 07%2f978-3-030-33812-1_3&partnerID=4 0&md5=7120d065b62d33b0d7fac71ed3c ccd49
22	Rejeb A., Rejeb K.	Blockchain and supply chain sustainability [Blockchain i zrównoważoność łańcucha dostaw]	2020	Logforum	10.17270/ J.LOG.202 0.467	https://www.scopus.com/inward/record .uri?eid=2-s2.0-85087129401&doi=10.17 270%2fJ.LOG.2020.467&partnerID=40& md5=3de66d9f452e1445339142ba03060 155
23	Moreno-Serna, J; Sanchez-Chaparro, T; Mazorra, J; Arzamendi, A; Stott, L; Mataix, C	Transformational Collaboration for the SDGs: The Alianza Shire's Work to Provide Energy Access in Refugee Camps and Host Communities	2020	SUSTAINABILI TY	10.3390/s u1202053 9	https://www.researchgate.net/publicati on/338550537_Transformational_Collab oration_for_the_SDGs_The_Alianza_Shi re's_Work_to_Provide_Energy_Access_i n_Refugee_Camps_and_Host_Communi ties
24	Schmitt, ML; Wood, OR; Clatworthy, D; Rashid, SF; Sommer, M	Innovative strategies for providing menstruation-supportive water, sanitation and hygiene (WASH) facilities: learning from refugee camps in Cox's bazar, Bangladesh	2021	CONFLICT AND HEALTH	10.1186/s 13031-021 -00346-9	-
25	Wang, N	We Live on Hope ... : Ethical Considerations of Humanitarian Use of Drones in Post-Disaster Nepal ...	2020	IEEE TECHNOLOGY AND SOCIETY MAGAZINE	10.1109/M TS.2020.3 012332	-
26	Barbour, S	Supporting Accountability for Sexual Violence in the Syria and Iraq Conflicts Innovations, Good Practices, and Lessons Learned through Private Criminal Investigations	2020	JOURNAL OF INTERNATION AL CRIMINAL JUSTICE	10.1093/ji cj/mqaa0 04	-
27	Komlossyova, ES; Schlossarek, M; Mackova, L; Medova, N	One step ahead? The use of foresight by Czech and Slovak non-governmental organisations	2020	EUROPEAN JOURNAL OF FUTURES RESEARCH	10.1186/s 40309-020 -00163-y	-

28	Parker & Alexander	Aid policy trends to watch in 2021	2020	The New Humanitarian	-	https://www.thenewhumanitarian.org/analysis/2021/01/04/humanitarian-aid-policy-trends-2021
29	Papoulidis	Five ways to build resilience in fragile health systems	2020	The New Humanitarian	-	https://www.thenewhumanitarian.org/opinion/2020/05/13/Fragile-State-Index-global-health
30	Angela Francis, Elrha, Ruth Salmon and Ana Florescu	Innovation to improve monitoring and evaluation for humanitarian GBV programming: An overview of findings from the humanitarian innovation fund's portfolio	2021	ELRHA	-	https://reliefweb.int/report/world/innovation-improve-monitoring-and-evaluation-humanitarian-gbv-programming-overview
31	Save the Children	Digital Safeguarding for Migrating and Displaced Children	2020	Save the Children	-	https://reliefweb.int/report/world/digital-safeguarding-migrating-and-displaced-children
32	Nelis, Tina Allouche, Jeremy Sida, Lewis	Evidence Synthesis: The Humanitarian Innovation and Evidence Programme (HIEP): Bringing New Evidence and Methods to Humanitarian Action	2020	IDS	-	https://reliefweb.int/report/world/evidence-synthesis-humanitarian-innovation-and-evidence-programme-hiep-bringing-new
33	F Menashy, Z Zakharia	Private engagement in refugee education and the promise of digital humanitarianism	2020	Oxford review of education	-	https://www.tandfonline.com/doi/abs/10.1080/03054985.2019.1682536
34	KB Sandvik	Wearables for something good: Aid, dataveillance and the production of children's digital bodies	2020	Information, Communication & Society	-	https://www.tandfonline.com/doi/abs/10.1080/1369118X.2020.1753797
35	A Betts, L Bloom, N Weaver	Bottom-up humanitarian innovation	2021	UNHCR	-	https://www.unhcr.org/innovation/what-is-bottom-up-innovation/
36	F Greenwood, EL Nelson, PG Greenough	Flying into the hurricane: A case study of UAV use in damage assessment during the 2017 hurricanes in Texas and Florida	2020	PLoS one	-	https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0227808
37	L Corsini, J Moultrie	Humanitarian makerspaces in crisis-affected communities	2020	AI EDAM	-	https://www.cambridge.org/core/journals/ai-edam/article/humanitarian-makerspaces-in-crisisaffected-communities/5DEB758016A2F9A0B3A9B5FA4CC86D43

38	I Bolon, J Mason, P O'Keeffe, P Haeberli, HA Adan…	One Health education in Kakuma refugee camp (Kenya): From a MOOC to projects on real world challenges	2020	One Health	-	https://www.sciencedirect.com/science/article/pii/S2352771420302597
39	E Yankah, O Mohamed, A Wringe…	Feasibility and acceptability of mobile phone platforms to deliver interventions to address gender-based violence among Syrian adolescent girls and young women in …	2020	Vulnerable Children and Youth Studies	-	https://www.tandfonline.com/doi/abs/10.1080/17450128.2019.1687965
40	S Babatunde, R Oloruntoba, K Agho	Healthcare commodities for emergencies in Africa: review of logistics models, suggested model and research agenda	2020	Journal of Humanitarian Logistics and Supply Chain Management	-	https://www.emerald.com/insight/content/doi/10.1108/JHLSCM-09-2019-0064/full/html
41	KB Sandvik	Digital dead body management (DDBM): Time to think it through	2020	Journal of Human Rights Practice	-	https://academic.oup.com/jhrp/article-abstract/12/2/428/5822573
42	S Pasha	Developmental Humanitarianism, Resilience and (Dis) empowerment in a Syrian Refugee Camp	2020	Journal of International Development	-	https://onlinelibrary.wiley.com/doi/abs/10.1002/jid.3454
43	S Heilbrunn, RL Iannone	From Center to Periphery and Back Again: A Systematic Literature Review of Refugee Entrepreneurship	2020	Sustainability	-	https://www.mdpi.com/2071-1050/12/18/7658
44	S House	Learning in the sanitation and hygiene sector	2020	-	-	https://opendocs.ids.ac.uk/opendocs/handle/20.500.12413/15514
45	G Dandurand, F Claveau	AI like any other technology: Social dynamics of expectation and expertise of a digital humanitarian innovation	2020	CIRST: Note de recherche	-	http://cirst2.openum.ca/files/sites/179/2020/05/Note_2020-02.pdf
46	A Smith, J Pringle, M Hunt	Value-Sensitive Design for Humanitarian Action: Integrating Ethical Analysis for Information	2020	Ethics of Medical Innovation,	-	https://link.springer.com/chapter/10.1007/978-3-030-36319-2_7

		and Communication Technology Innovations		Experimentation …		
47	KB Sandvik	Humanitarian wearables: digital bodies, experimentation and ethics	2020	Ethics of Medical Innovation, Experimentation, and …	-	https://link.springer.com/chapter/10.1007/978-3-030-36319-2_6
48	I Ormel, J Salsberg, M Hunt, A Doucet, L Hinton…	Key issues for participatory research in the design and implementation of humanitarian assistance: a scoping review	2020	Global Health Action	-	https://www.tandfonline.com/doi/abs/10.1080/16549716.2020.1826730
49	A Zwitter	International Humanitarian and Development Aid and Big Data Governance	2020	The Routledge Handbook to Rethinking Ethics in International Relations	-	https://www.rug.nl/research/portal/files/112159126/AZwitter_Routledge_annotated1_extended_AZ.pdf
50	J Watson, O Cumming, R Aunger, C Deola, RP Chase…	Child handwashing in an internally displaced persons camp in Northern Iraq: A qualitative multi-method exploration of motivational drivers and other …	2020	PloS one	https://doi.org/10.1371/journal.pone.0228482	https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0228482
51	C Turk	Any Portal in a Storm? Collaborative and crowdsourced maps in response to Typhoon Yolanda/Haiyan, Philippines	2020	Journal of Contingencies and Crisis Management	https://doi.org/10.1111/1468-5973.12330	https://onlinelibrary.wiley.com/doi/abs/10.1111/1468-5973.12330
52	Van Wassenhove L.N.	Sustainable Innovation: Pushing the Boundaries of Traditional Operations Management	2019	Production and Operations Management	10.1111/poms.13114	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85074604383&doi=10.1111%2fpoms.13114&partnerID=40&md5=7b12af15d3b697ae3e3cfbf5e6d30c24
53	Pascucci E.	Refugees in the IT Sector: Young Syrians' Economic Subjectivities and Familial Lives in Jordan	2019	Geographical Review	10.1111/gere.12315	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85057009632&doi=10.1111%2fgere.12315&partnerID=40&md5=9014b7e99aa697454f5a62d6ee1ef9f5

54	Heaslip G., Kovács G., Grant D.B.	Servitization as a competitive difference in humanitarian logistics	2018	Journal of Humanitarian Logistics and Supply Chain Management	10.1108/JHLSCM-08-2017-0042	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85055202162&doi=10.1108%2fJHLSCM-08-2017-0042&partnerID=40&md5=2e90f59a51e9b738e6cb96a5f1931eb3
55	Seifert L., Kunz N., Gold S.	Humanitarian supply chain management responding to refugees: a literature review	2018	Journal of Humanitarian Logistics and Supply Chain Management	10.1108/JHLSCM-07-2017-0029	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85043485762&doi=10.1108%2fJHLSCM-07-2017-0029&partnerID=40&md5=74561c4891df820c8585f35283f8c710
56	Heaslip G., Kovács G., Haavisto I.	Innovations in humanitarian supply chains: the case of cash transfer programmes	2018	Production Planning and Control	10.1080/09537287.2018.1542172	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85060714072&doi=10.1080%2f09537287.2018.1542172&partnerID=40&md5=b8f779cedf7be8ce82907752ec62697e
57	Regattieri A., Gamberi M., Bortolini M., Piana F.	Innovative solutions for reusing packaging waste materials in humanitarian logistics	2018	Sustainability (Switzerland)	10.3390/su10051587	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85047074656&doi=10.3390%2fsu10051587&partnerID=40&md5=636302931e70c491221ae200d71ba3a6
58	Regattieri A., Bortolini M., Ferrari E., Gamberi M., Piana F.	Biogas micro-production from human organic waste-A research proposal	2018	Sustainability (Switzerland)	10.3390/su10020330	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85040993686&doi=10.3390%2fsu10020330&partnerID=40&md5=1cc1ca9a65f804075b2fe5a559a43f11
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