Projects and innovation in humanitarian emergency response: insights from a case study of water, sanitation, and hygiene (WASH)

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Introduction

This paper explores the relationship between projects and innovation in humanitarian emergency response. This is an area that has to date received little attention from either project management or innovation scholars. Despite this lack of academic interest, the fields of humanitarian policy and practice have in recent years increasingly adopted the language of innovation and project management to describe and give shape to their activities (Betts & Bloom, 2014; Curlee & Fleischer, 2005; Fitz-Gerald, Molinaro, & Neal, 2001; Obrecht & Warner, 2016; Whitehead, 2015). This discursive shift has largely been driven by a growing recognition of the severe challenges facing humanitarian aid. According to the United Nations Office for the Coordination of Humanitarian Affairs (OCHA, 2017b), the number of people affected by natural disasters in 2016 was 204 million, with 65.6 million forcibly displaced by violence and conflict. Of these, 130.5 million were judged to be in need of humanitarian aid, with the total rising again in 2017 to 135.7 million (OCHA, 2017a). In the last 10 years, the number of people targeted for assistance has more than trebled, from 31 million to 95 million (OCHA, 2017a). Funding has also increased dramatically over the same period, but the gap between requirements, as assessed by Humanitarian Response Plans (HRPs) for different regions and countries, and funding received has increased fourfold (OCHA, 2017a).

Given these massive and growing needs, combined with constant pressure on the resources available to address them, it is not surprising that the humanitarian sector has turned to the concepts and practices of project management and innovation in the hope of finding solutions. They have been used as a way of structuring its response to what is increasingly presented as a crisis of the overall humanitarian system (Chandran, 2015; Ramalingam, 2013; The Guardian, 2016). Each in their own way, project and innovation management are typically rooted in discourses of efficiency and effectiveness, offering the promise of being

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able to achieve more with the same or fewer resources. However, our argument in this paper is that there are also important differences between the two domains as constituted within the humanitarian context which sets them in opposition to each other and frequently leads to tensions. This is in contrast to a growing theme in the wider literature on projects that regards them as more complementary, with projects often being seen as a vehicle for delivering change and innovation in the face of uncertainty (Davies, 2014; Davies & Hobday, 2005; Shenhar & Dvir, 2007).

In the case of humanitarian emergency response, the projectification (Midler, 1995; Johan Packendorff & Lindgren, 2014) of the field has largely taken the form of efforts to standardise, regulate, and professionalise humanitarian activities (Dijkzeul, Hilhorst, & Walker, 2013; James, 2016; Walker, Hein, Russ, Bertleff, & Caspersz, 2010). The main emphasis is on enhancing the operational efficiency of the humanitarian system, which is an entirely rational response in trying to cope with the scale, complexity, and uncertainty of humanitarian emergencies. Although many human and natural disasters have effects that require long-term interventions over a number of years, the humanitarian system simultaneously needs to be able to respond quickly and efficiently to unpredictably changing conditions and rapid onset disasters across different parts of the world (Chandran, 2015). Standardised project procedures, clear roles and responsibilities, coordination and logistics mechanisms, and stockpiles of latent resources and equipment, all help the humanitarian system to mobilise quickly.

However, this focus on operational rationalisation is not necessarily consistent with promoting the various activities and stages of an effective innovation process, echoing a long-established theme in the literature on organisations and innovation (e.g. March, 1991; Tushman & O'Reilly, 1996). As they have evolved in the humanitarian field, project management and innovation, although relatively recent discursive tropes in this setting, are potentially crystallising into two competing institutional logics (Bresnen & Marshall, 2011; Townley, 2002). This paper explores the implications of this trend, particularly in terms of the effects on humanitarian innovation. This latter choice of focus is because the interpretations of project management knowledge within the humanitarian community are arguably already consistent with the existing institutional landscape. As such, they are absorbed into and reinforce the dominant logic. In contrast, innovation, as an explicit subject of policy and practice, represents more of a departure from the status quo and, consequently, faces the usual inertia in seeking to effect any wide-ranging institutional transformation. Even so, there have been important steps towards promoting the humanitarian innovation agenda, drawing together a diverse range of actors, albeit with some voices being clearly more dominant than others. We explore these trends through evidence from a case study of one of the main sub-sectors of emergency response, the provision of water, sanitation, and hygiene promotion (WASH).

The remainder of this paper outlines the conceptual background and approach used to explore the relationship between projects and innovation in the humanitarian sector, followed by a

discussion of the research method, and a commentary on the main themes identified in the case study of WASH.

Understanding projects and innovation in the humanitarian sector

Until more recently, research on projects and innovation have tended to be conducted in parallel, with little communication between the two communities of scholars (Brady & Hobday, 2011; Davies, 2014; Davies & Hobday, 2005). This has changed, to some extent at least, in the last few years, but there is still substantial scope for clarifying the relationship between the two. It is often suggested, for example, that projects offer a suitable organisational form for promoting innovation. As Brady and Hobday (2011, p.276) have commented: "Whereas functional organizations focus inwardly on increasing performance by perfecting standardized processes and outputs, project structures focus outwardly on solving specific customer problems and encouraging innovation." At the same time, one of the major developments in the project literature has been a recognition of the wide variety of project forms and activities (Lundin et al., 2015; Lundin & Söderholm, 1995; Söderlund, 2011). This has been accompanied by an acknowledgement of the contingent nature of projects, their deployment for a whole range of purposes within and across different sectors, and their embeddedness in varying social, economic, and political settings (Engwall, 2003; Grabher, 2003; Lundin et al., 2015).

Thus, while projects are often used with the aim of supporting the innovation process, this is not always the case. As Lenfle (2008) and Brady and Hobday (2011) have proposed, some projects are focused on exploitation or optimisation, drawing on existing competencies to pursue clear and predefined objectives, while others are used for exploring emerging innovation fields (c.f. March, 1991). Consistent with arguments about organisational ambidexterity, the challenge is presented as how to manage the competing demands of exploration and exploitation; one way of doing this is through having a portfolio of differently positioned projects. For a variety of reasons explored in this paper, the humanitarian system presents a different situation. Its focal projects - the delivery of life-saving interventions in response to emergencies - have increasingly been the target of attempts to standardise and formalise them. They are about exploiting existing capabilities and refining them to provide a more coordinated, reliable, and efficient response to unpredictable, complex, and uncertain humanitarian crises. Although by no means the whole story, a particular discourse of project management has contributed to this trend. Paradoxically, however, these efforts at optimisation at the operational project level, driven by the best intentions of 'doing good', have arguably reduced the overall innovative capacity of the humanitarian system, ultimately undermining this overall purpose.

In this respect, humanitarian emergency response faces a similar paradox to that identified in the more critical projects literature, where the technical rationality of planning and control at the heart of project management regularly fails to live up to its own exacting expectations (Cicmil, Hodgson, Lindgren, & Packendorff, 2009; Cicmil, Williams, Thomas, & Hodgson, 2006; Flyvbjerg, 1998; Hodgson & Cicmil, 2006; Johann Packendorff, 1995). A good

example of this is the burgeoning strand of work on megaprojects (Davies, Gann, & Douglas, 2009; Flyvbjerg, 2003, 2007, 2014, 2017; van Marrewijk, Clegg, Pitsis, & Veenswijk, 2008). As Sanderson (2012) has argued, there are different explanations why such projects do not meet the goals set for them, each grounded in different assumptions about risk, uncertainty, and governability. These include strong incentives for project sponsors, contractors, and other interested parties to misrepresent the viability of projects (Flyvbjerg, 2003, 2014; Flyvbjerg, Holm, & Buhl, 2002), the lack of robust governance arrangements able to cope with the unavoidable uncertainty and complexity of major projects (Miller & Lessard, 2001; Winch, 2009), and the collision of multiple cultures and rationalities competing in the day-to-day negotiation of project activities (Clegg, Pitsis, Marosszeky, & Rura-Polley, 2006; Pitsis, Clegg, Marosszeky, & Rura-Polley, 2003). Each in their own way these features of megaprojects highlight the limitations of planning and control, from which lessons for emergency response projects can be drawn. However, there are also important differences between the two types of projects, especially in the perception of risk.

The literature on megaprojects seeks to explain why these challenging endeavours, with high likelihood of failure, ever get off the ground in the first place. There are similarities here with the work by Hirschman (2015 [1967]) on development projects, where he introduces the principle of 'the hiding hand'. His argument is that people over-estimate the likelihood of success when initiating a project because they are ignorant of the costs and difficulties they will encounter. However, when unanticipated obstacles and challenges do arise, great efforts are often made to overcome them, leading to creative solutions. This is an effectively positive view of people's capacity to cope with challenges. While Flyvbjerg (2014) concurs many major projects would not even get going without a strong element of optimism and hubris, Flyvbjerg and Sunstein (2016) challenge the principle of the hiding hand, arguing that it is more often malevolent than benevolent, hiding obstacles that have little chance of being overcome. Either way, it is clear that over-confidence often plays a key role in getting major projects started, encouraging those involved to take on risks they might otherwise be unwilling to.

Although there are many similarities between development and humanitarian emergency response projects, an important difference is that the former are projective whereas the latter are reactive, responding to disasters as they occur.[2] This lends them a different character in terms of perceptions of risk and uncertainty. For emergency response, the issue is not so much about whether or not it is too risky to initiate the project, but more about the dangers of not acting, especially in situations where time is of the essence. This position is guided by the widely espoused values among humanitarian actors of humanity, impartiality, neutrality, and

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[2] This does not mean that all disasters attract the same attention. As de Waal (2010, p.S133) notes: "Among the governmental donors to humanitarian programmes, and among the relief agency executives who help to shape the global humanitarian response priorities each year, there is policy triage. Some crises elicit a far greater response than others. We like to believe that the main criterion for a relief response is gravity of need. But that is always a subjective estimate, and is always modulated by other considerations such as danger, difficulty and expense."

independence in providing assistance to alleviate suffering of those who need it (Carbonnier, 2015).[3] Although it is perhaps counter-intuitive, given that humanitarian response involves operating under extreme conditions of disaster or conflict, attitudes to risk displayed by humanitarian organisations are widely considered to be increasingly conservative. These attitudes have been shaped by successive rounds of evaluation following humanitarian interventions, especially where these have been judged to be less than successful, prompting ever greater emphasis on formalising mechanisms for planning and control in an effort to minimise further harm (Christopher & Tatham, 2011; Cioffi-Revilla, 2014; Fitz-Gerald et al., 2001). However, we argue that a by-product of this attitude to risk has been a caution about novelty, which can create barriers to innovation. In this respect, emergency response shares something in common with high reliability organisations. According to Rijpma (2003, pp. 41–42), such organisations "are extremely vigilant in identifying potential hazards. They are also reluctant to learn in a trial-and-error mode, because the first error may be the last trial. They therefore set up reporting systems to detect and learn from any incident or disturbance that occurs, because, in their philosophy, even a minor disturbance may set a sequence in motion that ends up in disaster.". This means that innovation can become partly uncoupled from operational activities and, to the extent that it occurs, is shaped by a logic of optimisation and incremental changes to existing ways of doing things. In the case of humanitarian emergency response, there is a preference for tried-and-tested equipment, processes, and organisational arrangements during intervention projects. This is understandable as an attempt to enhance predictability of those elements over which practitioners have some control when working under conditions of unpredictability and limited control. However, it also introduces a number of barriers to more radical innovations which, given the increasing demands on the humanitarian system are highly likely to limit the capacity of humanitarianism to achieve its (also expanding) ambitions.

In seeking to understand the complex influences on the relationship between humanitarian projects and innovation, we draw inspiration from practice-based approaches, focusing on the interlocking practices and institutional work involved in shaping the evolution of different elements of action in the humanitarian field (Bourdieu, 1990; Marshall, 2014; Nicolini, 2012; Schatzki, Knorr Cetina, & von Savigny, 2001). Based on a refinement of the conceptual framework developed by Ramalingam *et al.* (2015), this involves looking in detail at the following thematic areas and the practices surrounding them:

- ○ Resources - focusing on the practices through which resources of different kinds (finance, people, time, knowledge, technologies, political influence) are generated and deployed.
- ○ Roles - including how these are constituted, the activities they are formally and informally involved in, the power they have in shaping the system in terms of the ability to mobilise different types of resources (see above).

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[3] As they have evolved, these core humanitarian principles arguably entail similar, if not greater, levels of optimism as megaprojects given that the definition of need is by no means fixed and there has been a reliable tendency for the ambitions of humanitarianism to increase even faster than the capacity of the humanitarian system to meet them (Barnett, 2005).

- ○ Relationships - practices governing the relationships and interactions between actors (and other non-human elements) in the humanitarian system. These may take numerous forms, whether competitive or collaborative, bureaucratic or market-based, long term or short term.
- ○ Rules - the formal and informal rules relating to humanitarian work which help to shape roles and responsibilities, activities and interactions, deployment of resources, etc.
- ○ Routines - closely related to rule-driven practices, routines refer to the myriad repeatable patterns of behaviour and ways of thinking that help to constitute the humanitarian system. These may be more or less widely shared, from highly localised ways of doing things, to globally standardised procedures.
- ○ Results - These are the evaluative practices through which the results of humanitarian action are measured and judged. These are significant because they play an important role in establishing its legitimacy and ensuring the continuing flow of resources from donors and other actors. They also shape how those involved in the humanitarian system view what they do and where efforts for innovation and learning are concentrated.

An important benefit of this framework is that it focuses attention on key elements that together help to shape the dynamics of any given field of social action. Crucially, it also provides a workable vocabulary for making sense of particular empirical settings, offering alternative lenses through which to bring different aspects into sharper focus. It is important to acknowledge, however, that the act of separating into different categories, while useful for certain sensemaking purposes, also distracts attention from others. By choosing to focus on these elements individually, for example, we risk downplaying the connections between them and the processes through which they evolve.

Research method

The paper is based on data from a year-long study of humanitarian innovation conducted for the UK Department for International Development (DfID). The research involved three main strands of work. The first was an extensive literature review of relevant developments in innovation management and humanitarian innovation (Bessant et al., 2014). Secondly, we carried out semi-structured interviews with around 50 respondents, connected in varying capacities with the humanitarian sector, to build up an overall picture of the nature of the humanitarian innovation ecosystem. These included senior staff in donor organisations, governmental and international agencies, non-governmental organisations (NGOs), academics, management consultants, and private sector suppliers. The third strand of the research programme involved five in-depth case studies. Four of these focused on key areas of humanitarian emergency response: food, shelter, health, and water, sanitation, and hygiene (WASH). The fifth case study was an investigation of humanitarian funding models and their implications for innovation. Overall 150 interviews were conducted during this stage, as well as a wide-ranging analysis of documentary sources and secondary material. This paper concentrates on the findings from the WASH case study, although drawing relevant insights

from the other cases and stages of the research. As with the other case studies, the analysis was based on multiple rounds of coding (using Atlas.ti) thematically guided by the sets of practices referred to in the previous section, as well as issues relating to the various stages and activities of innovation. As mentioned above, this paper uses the thematic categories as different interpretative lenses for exploring the broader institutional shaping of projects and innovation in the humanitarian domain. As such, we focus less on the other aspects of the coding, such as those looking at the more concrete unfolding of innovation and project activities over time.[4]

The case of water, sanitation, and hygiene (WASH)

This section presents the main themes emerging from the study of the WASH sub-sector in terms of the relationship between projects and innovation. These are organised according to the practice areas identified in the conceptual framework, with some areas combined for ease of discussion. However, before turning to these it is useful to provide some background to the nature of the WASH sub-sector and its position among the various activities involved in humanitarian emergency response.

As the humanitarian field developed, an increasingly formalised system of specialist roles and responsibilities emerged. These divide up the response effort into a number of critical activities usually required, to a greater or lesser extent, in any emergency situation. These include the provision of shelter, food, medical assistance, security, and WASH. Each of these areas have tended to develop their own assemblages and repertoires of specialised knowledge, technologies, and behaviours. In the case of WASH, as the separate components of the acronym suggest, the sub-sector is further subdivided into three different but related areas: water, sanitation, and hygiene promotion. A number of interviewees commented that there are more similarities between water and sanitation respectively than with hygiene promotion. Water and sanitation are usually perceived as having a more engineering focus, with an emphasis on equipment and technological solutions, whereas hygiene promotion is considered to be more about behavioural issues, with practitioners drawn more from social science disciplines than engineering backgrounds. Having said that, there has been a more recent acknowledgement of the need to understand different cultural practices relating to water and especially sanitation. As one interviewee commented:

> "Sanitation is a tougher one than water – you can do a lot with technology in water – but if you look at sanitation I think 90% is about human behaviour. So the innovations there has to be more around how you engage with people than with technology and science. There is technology and science that can make it easier and

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[4] There is something of a social science version of the Heisenberg uncertainty principle operating here: the more closely we look at the individual components of the conceptual framework, the more their temporal and processual interactions slip from view. It is difficult to keep both perspectives in equal focus at the same time, as we have experienced in writing other analyses of the data using a more process-based lens on humanitarian innovation (e.g. Ramalingam et al., 2015).

better but, more often than not, when I look at what is going on ... if people do not want to use it they are not going to us it." (Interview W05).

The nature of project and innovation activities in the three WASH sub-sectors is also influenced by the relative priority they are accorded in the time-based hierarchy of emergency response activities and the order in which they are delivered, although this too is changing. According to one respondent: "We used to rush in and just do water and then do sanitation if we had time. Now you don't go in unless you're doing all three." (Interview W41). This shift has been influenced, among other things, by the changing temporality of emergencies and how emergency response is classified.[5] Rapid onset disasters constitute a significant portion of demand for humanitarian action, but the immediacy suggested by the language of disaster relief and emergency response can be misleading. Many humanitarian crises develop relatively slowly and the effects of disasters can be protracted. For example, according to UNHCR figures, 13.4 million refugees (two-thirds of the total refugee population) were classified as being in protracted refugee situations at the end of 2017, having been displaced for five or more years (UNHCR, 2018). Longer time horizons for humanitarian emergency interventions have encouraged a greater focus on more enduring WASH provision, shifting attention to sanitation and hygiene promotion. Even so, water continues to attract the majority of attention and resources. Although precise figures are not available, the consensus among interviewees was that around 80% of operational funding in WASH goes to water. As we shall see in the following sections, practices surrounding the allocation of resources have an important influence on the nature of humanitarian emergency projects and the relative emphasis on operational and innovation activities.

Resources

Resource allocation strongly favours operational projects over innovation activities. To a large extent this is driven by the demands of donors (actual and expected) and the need to maintain the legitimacy of humanitarian action (Macrae, 1998; Olsen, Carstensen, & Høyen, 2003). It is about demonstrating the judicious and efficient use of resources in responding to humanitarian needs. Donors expect a high proportion of their contributions to be seen directly helping those targeted for assistance. Activities not directly related to delivering support to those in need are typically given a lower priority. This tends to mean that there are significantly fewer resources available for innovation because the direct benefits are not immediately obvious or, given the uncertain nature of innovation, may not actually materialise. It also means that those innovations that do emerge are often ad hoc and

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[5] As with any sort of classification, the boundaries of meaning are arbitrary and potentially subject to continuous renegotiation, but nonetheless can have important practical implications (Bowker & Star, 1999). A good example of this is the distinction drawn between humanitarian response and development initiatives, which have evolved into separate spheres of practice despite considerable overlap in their goals and activities. The increasing focus of humanitarian action on long term chronic emergencies blurs the boundaries with development and yet many interviewees identified a continuing separation and distance between the two sets of practitioners.

incremental, occurring during operational activities and/or within the constraints of existing resources.

The amount of resources specifically dedicated to innovation activities are miniscule in comparison with those committed to operational priorities. As far as we are aware, there have so far been no systematic attempts to calculate the proportion of the overall WASH budget that is spent annually on innovation. While some of the larger humanitarian actors have started to set aside money for formal innovation activities, created specific roles for innovation managers or champions, and established labs or innovation spaces, no total figures exist for such expenditure and even within individual organisations there are no reliable estimates of what proportion may have gone to WASH related innovative activities. In our interviews, rough estimates were made by knowledgeable sources that historically 80% of such expenditure will have been on water, although within the last five years there has been a significant increase in spending on sanitation to, perhaps as much as 40% of the total. Innovation spending on emergency hygiene has been described as being "miniscule". When asked if WASH humanitarian innovation spending might be as high as 1% of total expenditure, only one large donor interviewed thought that this seemed like a reasonable assumption. Most felt it was considerably less.

This is influenced by the dominant structure of funding for humanitarian emergency response. As with other non-profit areas where activities are dependent on charitable donations and government funding, there is the expectation that the money received will be used for the direct benefit of target groups rather than for overheads or other indirect costs (Caviola, Faulmüller, Everett, Savulescu, & Kahane, 2014; Portillo & Stinn, 2018). For individual donors, the visibility of humanitarian operations has been shown to have an important effect on the willingness to give money (Olsen et al., 2003).[6] This is partly about demonstrating presence, with NGOs and other humanitarian actors ensuring they have enough branded "t-shirts on the ground". For governmental and institutional funders, there are detailed rules about how resources can be used and typically strict requirements about reporting and demonstrating impact. These tend to encourage risk avoidance and impose funding cycles that tend to promote a short-term focus, both of which can constrain innovation. As one interviewee commented: "… with one year funding over and over again there isn't time to do it differently. You do one twelve months cycle and you are already writing your next proposal after nine mouths. You are stuck. There is no space to innovate." (Interview W28)

Roles and relationships

The humanitarian sector is an enormously complex ecosystem of actors, activities, and interactions, creating huge challenges in terms of coordination and managing appropriate

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[6] While visibility is important, this is not a case of 'there is no such thing as bad publicity'. This is shown by the response of donors to recent media reports about sexual misconduct among aid workers and how these had not been acted upon by NGO senior managers, with accusations of a deliberate cover up.

responses to crises. The role of the UN in coordinating international humanitarian emergency response has been progressively strengthened and formalised over the last fifty years through a series of resolutions of the General Assembly. The timing of these has typically been in response to particular landmark events where the system of relief is seen to have come under strain and, in the most extreme cases, conspicuously failed. As the UN Joint Inspection Unit (Allen, Sibahi, & Sohm, 1980, p. p.1) noted: "The hundreds of donor governments and international and voluntary organisations involved in international relief have often provided a chaotic 'non-system' of independent responses to disaster needs, resulting in waste, omissions, duplication and inefficiency in the delivery of relief supplies, equipment and personnel."

Landmarks include the decision to set up the UN Office of the Disaster Relief Coordinator (DRC), based in Geneva, in 1971, the establishment of the Department of Humanitarian Affairs and appointment of an Emergency Relief Coordinator (ERC) in 1992, the creation of the Inter-Agency Standing Committee in 1992, which was subsequently restructured to form the Office for the Coordination of Humanitarian Affairs in 1998, and the formation of 11 sector or theme-based clusters in 2005. The WASH cluster commenced operations in 2006 under the leadership of UNICEF. It is made up of 32 full-time members drawn from UN agencies, international organisations, and international NGOs, with active roles also being played by donor organisations, civil response agencies, and academic institutions. As with the other landmark developments, the cluster approach is mainly about improving the coordination of complex response efforts during emergency situations through preparedness and project planning. It is primarily intended to optimise operational effectiveness under conditions of extreme uncertainty, especially during rapid onset emergencies where the speed and efficiency of response can have a major effect in reducing the scale of suffering. The cluster approach came about because of notable coordination failures, specifically relating to the response to the Indian Ocean tsunami of 2004 (Ayele, 2014).

The positive intentions of these efforts to improve operational effectiveness are undoubted and few would question their necessity. However, their benefits have not been evenly spread, with some clusters being seen as performing better than others. Several interviewees commented that the WASH cluster is relatively cohesive and well-functioning. According to one respondent: "The WASH cluster is quite a cohesive sector. It is a strong functioning cluster compared to some others and there are recognised actors. There is a level of cohesion that lends itself to push forward innovations. There is a strong global structure." (Interview W32). Even so, innovation tends to be more an informal by-product of interactions between cluster members than something that is consciously pursued. A good example of this is the Emergency Sanitation Project, a consortium of NGOs funded by OFDA, designed to identify specific areas of need in this area. According to one respondent: "This came out of a few meetings and there was a lot of kind of discussion in the corridors at cluster meetings or whatever saying sanitation is a problem, we're not really getting the results we want from suppliers and things like that ... And I think there were some high aims on that trying to get some different voices into the discussion." (Interview W34).

Another barrier to effective innovation involves disconnections between operational projects (i.e. emergency interventions in response to humanitarian crises) and the innovation process. Innovations are often developed distant from the context of use, which can mean that they are not necessarily responding to the specific needs of users and beneficiaries. Several interviewees complained about overly technical, complicated, and expensive technologies for water and sanitation developed with little understanding of the specific needs of different emergencies. According to one NGO practitioner: "Despite glimmers of a system of innovation, the sector is still a prisoner of its funding structure and political history … it is very competitive at all levels between donors, agencies, suppliers, etc., and all focused on securing access to more funds … not necessarily producing better ways of doing things called for by the voices/demands of the end user/market. There is lip service to higher ideals of co-ordination, co-operation etc."

The ultimate success of the innovation process depends on being able to make connections between the needs of users and the potential innovations able to meet those needs. How this is achieved typically sits on a spectrum between demand-pull and technology- (or solution-) push, although the emphasis in the innovation literature more recently has been on approaches that combine elements of both through co-design and a more interactive engagement between users and producers. However, as suggested in the literature on user innovation, it is not always obvious who users are, let alone what their needs are (von Hippel, 1986, 2005). In the case of the WASH sector, several of those interviewed identified NGOs as the primary users of innovations as they are the ones who deliver the innovations on the ground when responding to emergencies. As such, they are in a suitable position to be able to specify what solutions are needed and whether they work in practice.

Having said that, it is evident that there are potentially multiple types of user, including both large and small NGOs, UN agencies, governments, community groups, the armed forces, and affected populations themselves. As one respondent put it, "It's difficult to define the real needs because there [are] many people and organizations involved". It would appear that there are three main challenges in attempting to define innovation needs in the humanitarian area: firstly, it is not always clear who is the main beneficiary; secondly, there is the issue of who is able to act as an effective voice for beneficiaries (e.g. local community leaders, governments, NGOs); and thirdly, it is uncertain whether those representing beneficiaries have a deep understanding of needs in response to any particular humanitarian crisis.

There is nevertheless a clear recognition that successful innovations are those that ultimately meet the needs of those affected by humanitarian crises on the ground. However, there are important variations in the extent to which actors engaged in innovation have direct experience of such needs and, therefore, there is a potential disconnect between affected communities, those that deliver emergency responses, and those that generate innovations. In the opinion of one respondent: "Agencies seem to view that there is no need to involve end users that much but some think the other way. I think there is some uncertainty of how to involve them" (Interview W29).

Even given these difficulties, some actors in the WASH ecosystem engage much more with end-users than others. For NGOs with direct experiences of responding to emergencies, there is the potential to learn from deploying particular solutions in the field, thereby influencing the future understanding of needs. Even so, the priorities are clear in that the immediate demands of the response project understandably need to come before those of research and evaluation activities. As one interviewee commented: "I would say that first we are operationally driven and then comes the research. So all the research we do is normally operational research." (Interview W42).

Not all innovation actors have the same opportunity to connect directly with the field of operations. This is especially so for many of the suppliers of WASH technologies who are frequently reliant on intermediaries for their understanding of what is needed. In the case of one supplier we interviewed, they rely on agencies and NGOs to feed back information from the field about the particular conditions of any given crisis. However, being distant from the point of need, they were unsure about the quality of this information and how far it is an accurate representation of actual needs.

As explained in more detail below, there is a critical issue about the changing type and context of humanitarian disasters that means that the innovation landscape has to be constantly shifting to respond to this. It was suggested that many in the humanitarian aid community were primarily experienced with working in rural settings and that solutions designed for such environments are not appropriate for a more urban setting. A recurring theme in the interviews was also the need to be sensitive to the particular social, cultural, political, economic, and environmental conditions of humanitarian crises occurring in different parts of the world. Without an understanding of these complex differences, it is easy to offer solutions that do more harm than good. There are, nevertheless, also pressures to offer standardised solutions so as to achieve efficiencies. As one interviewee commented: "When we are talking to NGOs they usually ask us to find a universal solution. When we find universal solutions there is always someone who says, 'In the South of Sudan it wouldn't work' (Interview W03).

As such there is clearly a tension between providing solutions that are more generally applicable and ensuring that the particular requirements of emergency response are met. A barrier to managing this tension, according to several respondents, is the tendency to provide solutions that are too complicated to be usable in the context of most disasters. For one interviewee, "... innovation is the most simple direct means of serving needs". Indeed, the general view was that many WASH related problems in emergency situations can be addressed through relatively simple solutions, yet there is often an impetus for developers to offer complex solutions that are not necessarily appropriate for the emergency context. In some instances this is driven by the nature of the funding process and how decisions are made about the allocation of resources. As one respondent suggested:

> "... there are some areas where people have come up with some magical devices when there are things that are really very simple and doing the job very effectively ... If you

speak to Water Aid, for example, people are approaching them every week with a new magical device which is going to solve the whole world water crisis - it is usually a solar pump or water filter - and these devices, some go on to win competitions and get significant funding [when] in the end they are essentially not that appropriate." (Interview W26).[7]

Rules and routines

The rules of engagement for humanitarian action are strongly influenced by key actors, networks, and alliances, while others have a less influential voice. Donors, governmental and inter-governmental agencies, and large NGOs play a powerful role in shaping the norms and expectations of what constitutes appropriate humanitarian response. To a large extent this relates back to a series of guiding values and ideals defining humanitarianism, with the emphasis of alleviating suffering and avoiding harm (Hilhorst, 2005; Hilhorst & Jansen, 2012; Macrae, 1998). This results in a very cautious approach to managing risks which, in turn, can lead to a resistance to change. One interviewee commented: "Accountability is worthwhile, innovative in the HA sector context, but now it has become institutionalised - fits into boxes, fit for purpose, evidence base, value for money, etc., etc., what was very worthwhile and noble in its intent, became, like so much in the humanitarian sector, it has become institutionalised, professionalised." (Interview W10). Similarly, as Dijkzeul et al. (2013, pS4) have suggested:

> "Especially since the Rwandan genocide of 1994, and the subsequent soul-searching in the humanitarian community … the humanitarian sector has witnessed an (incomplete) trend towards professionalisation, promoted the use of common standards and indicators … put greater emphasis on education and training, and paid more attention to evaluation and accountability of humanitarian action. Simultaneously, this has reinforced a related trend to develop manuals, guidelines, and other instruments to improve—or at least to formalise—humanitarian action."

A good example of efforts to standardise and regularise humanitarian response has been the SPHERE project (The Sphere Project, 2011). Initiated in 1997 by the International Red Cross and Red Crescent movement and supported by a number of NGOs and other agencies, the aim has been to establish a set of common principles, rights, and duties, such as the right to a life with dignity, the right to receive humanitarian assistance, and the right to protection and security. It also emphasises the accountability of humanitarian agencies to affected

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[7] The following comment from Dorea (2014, p. 2) vividly describes the problems of separation between the developers and users of emergency WASH technologies: "Water treatment technologies exemplify the slow or non-existent effective uptake of new developments in humanitarian emergencies. Many novel 'high-tech' processes that are efficient in the removal of particular contaminants in controlled conditions do not become effective solutions in practice. Field experience suggests that some of the commercially-available treatment 'kits', many do not seem to be compatible with humanitarian relief requirements. Some of the common shortcomings are the inability of these technologies to cope with field conditions typically encountered in resource-limited humanitarian emergency contexts. Arguably, this is also a shortcoming of the development process of these technologies."

communities. It seeks to put these principles into practice by setting a series of core and minimum standards. The aim is to provide a universal framework for emergency response projects. However, there is a paradox at the heart of this attempt to translate universal humanitarian principles into universally applicable practices that are appropriate for all situations (Dufour, Geoffroy, Maury, & Grünewald, 2004). This is evident in the way the SPHERE Handbook is presented "as a tool to recognise different contexts and to adapt response programmes accordingly: it guides practitioners in their reflections around reaching a universally applicable standard in a concrete situation or context" (The SPHERE Project, 2011, p.11).[8] According to some respondents, the demands of universality and sensitivity to context are contradictory. For example, one interviewee commented as follows:

> "… in some places, Western Sudan and Darfur, it's very difficult to reach a SPHERE standard of 14 litres per person per day because there is not surface water in the dry season and people live off very small amounts of water. So to get 14 litres per person per day it's pretty difficult in Darfur. So you have to be careful how you use them. When SPHERE came out in the first place people worried [donors] would use it as a whip - If you don't meet certain standards you don't get our money" (Interview W40).

This does not, of course, mean that setting standards does not serve useful purposes. Where there are urgent pressures to deliver humanitarian response, standards can potentially save time and decision-making resources by reaching agreement on what should be delivered away from the heat of engagement. However, standardisation taken too far can obviously have negative effects where the conditions of application change or are unpredictable. This is especially problematic in situations where there is a disconnect between operational activities and those with the resources and influence to promote and diffuse innovations in how these activities are undertaken. Given the general absence of market signals, NGOs, UN agencies, and other organisations shaping humanitarian innovation are dependent on other mechanisms for making connections between the spaces where innovations are generated and developed and where they are used.

As suggested by a number of respondents, there have been progressive attempts in recent years to develop a more systematic evidence-base from which to make decisions about improving operational activities and equipment and how resources for innovation are allocated (c.f. Dijkzeul et al., 2013). However, there are still a number of barriers. Several interviewees spoke of the divide between NGOs and universities that can make communication between them difficult. The two sets of actors tend to have different perspectives on the degree of accuracy and level of rigour required by research and the time required to conduct it. As one interviewee commented: "The time frame for NGOs is very different from the time frame for scientists. If we were just doing research it would be

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[8] The SPHERE Handbook is nearing the end of a long process of a major revision, following an extensive consultation process involving thousands of contributors. The commitment to improvement is unquestionable and benefits will hopefully ensue. Nevertheless, it would be a remarkable achievement if the new edition successfully addresses the tension between the ambitions of wedding universal humanitarian principles to the specific challenges of individual disasters through the practice of standard setting.

longer." (Interview W30). Another suggested that there are different standards of evidence and accuracy between NGOs and universities, describing the evidence collected by NGOs as being more anecdotal. However, from the NGO perspective there is a question about how much evidence is actually needed to serve their purposes. The standards of practice accepted within the academic scientific community may not be necessary to provide sufficient grounds on which to make decisions about alternative products or approaches.

There are important limitations here in terms of the practicalities of conducting research and evaluation in emergency situations.

> "One of the challenges is that in emergency situations it is not deemed appropriate to do research and that can be very true but if it is always deemed inappropriate to do research than how can we actually get to evidence based practice because no one is ever doing any research because the situation is always so critical." (Interview W26).

Especially in rapid onset emergencies and in the early stages of responding to humanitarian crises, research evidently needs to take lower priority than providing assistance to those affected.

Gathering systematic evidence has become more important for humanitarian organisations to justify novel and untried technologies and approaches to funders. Larger NGOs have increasingly found it necessary to document what they are doing and collect evidence to show the suitability and effectiveness of a given approach or piece of equipment. For example, Oxfam GB has been conducting cost analysis and testing of solar powered water pumps to evaluate their feasibility in emergency contexts. This resulted in technical data on the pumps – data that can be used to allay any concerns of donors about the predictability of the technology and/or whether the higher upfront costs sufficiently offset the lower running costs compared to traditional solutions.

Results

The humanitarian system is influenced by evolving practices of evaluation that periodically set in motion waves of change, but for the most part support incremental improvement and have tended to be quite reactive and strongly influenced by the need to maintain support from donors (Pérouse de Montclos, 2012). For example, the various coordination mechanisms introduced since 1971 have each been the result of formal evaluations conducted after notable failures in humanitarian response. These prompted new organisational arrangements, which could be considered innovations in themselves, but were mostly about optimising existing ways of working. According to Barnett (2005, p. p.729):

> "The field was becoming rationalized, aspiring to develop: methodologies for calculating results, abstract rules to guide standardized responses, and procedures to improve efficiency and identify the best means to achieve specified ends. Humanitarian organizations were also becoming bureaucratized, developing spheres

of competence, and rules to standardize responses and to drive means-ends calculations. Professionalism followed, with demands for actors who had specific knowledge, vocational qualifications that derived from specialized training, and the ability to follow fixed doctrine."

Furthermore, the care ethic central to humanitarianism has been translated into a strong emphasis on accountability. However, this can also lead to an unwillingness to experiment with new technologies and approaches. Referring to a particular donor organisation, one interviewee commented: "They're so stuck in their ways of to get a predictable outcome you need to do this, this, and this. And you should not be innovating and experimenting on people in refugee camps … They really don't like to be seen doing anything that has any element of a risk with it." (Interview W34).

In the absence of market mechanisms, a key potential driver of innovation is the high level of concern within the humanitarian aid sector resulting from the occurrence of an increasing number and severity of emergency situations. The perception of need serves to focus people, activities, and resources on innovative efforts. In the case of WASH, there is a widely held view that without innovation, the sector will not be able to meet the increasing and shifting demand for emergency response. Not only is there an increasing trend in the number, frequency, and severity of humanitarian crises, but it is also generally acknowledged that the nature of disasters themselves is changing. This change has implications for the types of emergency response that are appropriate.

The worldwide growth in urbanisation is a key factor here. The proportion of people living in urban areas is estimated to increase to 67% of the global population by 2050, compared to 47% in 2000 (OCHA, 2013). Much of this shift will be in the least developed countries, with the proportion set to double to 50% over the same period. As several respondents suggested, many of the current solutions employed by the WASH sector were designed for non-urban situations and may not be appropriate for the future. The Haiti earthquake in 2010 was identified as an important turning point in recognising the need for different solutions in responding to urban disasters. In the words of one of our respondents:

> "Haiti [was] a wake-up call – the product, processes and programming modalities that we have are no longer fit for purpose. The number of horror stories that you hear on the WASH side in Haiti - people trying to build pit latrines in concrete or where there was a very high water table, or people getting caught in contracts with Portaloo companies ... with no cost recovery mechanisms or exit strategy, nowhere to put the slurry, I could go on and on. It made us realise that we didn't have the tools that we need. And donors and agencies recognised that." (Interview W32).

It is evident that the historical progression of particular kinds of humanitarian crisis has had an important influence on shaping the overall pattern of innovations in the WASH sector. This includes not only the type of innovations generated, but also the intensity of effort, resulting in ebbs and flows in the innovation ecosystem over time. For example, the serious

problems in coordinating the humanitarian response to the Indian Ocean earthquake and tsunami in 2004, and similar problems in dealing with the crisis in Darfur in 2004 and 2005 prompted the development of the cluster approach (Stoddard, Harmer, Haver, Salomons, & Wheeler, 2007). The implication is that the innovation ecosystem as a whole tends to evolve in response to different humanitarian events. This historical trajectory appears to take the form of what has been termed a punctuated equilibrium with bursts of concentrated activity punctuating longer periods of less intense development (Gersick, 1991).

Thus, specific disasters and their projects of response cast a historical shadow of varying length, with new events adding to and sometimes transforming the humanitarian agenda. It remains to be seen, but it is likely that this punctuated equilibrium will become more compressed as the incidence of disasters increases and offers more and more experiences from which to learn. However, there is by no means a straightforward linear connection between humanitarian crises, perceptions of need, innovation activities, and innovation outcomes. The processes of identifying needs and deciding on appropriate solutions is complicated by such things as the numbers of stakeholders involved, competing perspectives on priorities and how to tackle them, uncertainties about the specific conditions presented by different disasters, and limits on knowledge flows from the point of need to those seeking to develop innovations in the WASH sector. As we have seen for each of the practice components discussed above, there are elements of each that generate a separation between operational projects and innovation activities, which means that the capacity for learning between the two domains is critical.

Conclusion

Taken together, the different areas of practice in the humanitarian system we have explored have had the effect of concentrating on the narrow efficiency of project delivery at the expense of promoting wider innovation in the field. According to Obrecht and Warner, (2016, p. 21): "The humanitarian system features perverse incentives and many other institutional blockages to change. These arise as a result of broken feedback loops between users and producers and indirect links between those who fund an innovation and the innovation's intended end users." These blockages are often connected to a particular discourse of project management that over-emphasises the efficacy of planning and control, focuses on minimising short-term risks at the expense of long-term improvement and capacity development, and reinforces an institutional logic resistant to change. Even so, there are some indications of the emergence of a growing discourse of innovation that may provide a competing logic and, with sufficient momentum, the potential for transforming the dominant state-of-affairs. Innovation was a key theme at the World Humanitarian Summit in Istanbul in 2016, bringing this issue more to the fore. However, processes of discursive and institutional transformation are typically not quick. An explicit interest in innovation came onto the humanitarian agenda around 10 years ago, but it takes time for such ideas to develop, become accepted, and begin to shape practices. There has arguably been an acceleration of these processes, but the effects are still playing out and remain to be seen.

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