

# Strengthening the Humanitarian Innovation Ecosystem



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# Strengthening the Humanitarian Innovation Ecosystem

## **Humanitarian Innovation Ecosystem Research Project** Final Report

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# Executive Summary

THIS REPORT COMES AT a time when the international humanitarian community is facing unprecedented challenges that are growing in scale, scope and complexity. There is growing awareness of the need for transformational change in *what* humanitarian actors do and how they do it, to maintain relevance, reputation and impact. This report focuses on new and growing efforts to achieve such change through humanitarian innovation.

Wherever it happens, innovation is about creating value through the application of new ideas. But it seldom occurs purely by chance. The overarching aim of this report is to analyse and assess the *ecosystem of actors and factors shaping innovation within the humanitarian sector*.<sup>1</sup> The objective is to understand and recommend how best to strengthen and improve the humanitarian innovation ecosystem so it can make the best possible contribution to overall humanitarian effectiveness.

Innovation ecosystems vary considerably between sectors, industries and countries. But the most effective examples have a number of common features. These include:

- a clear sense of overall strategic vision around which to focus innovation search and selection behaviour;
- a sufficient supply of necessary resources – especially finance and human resources – and clear routes to enable these to flow into the system;
- a high level of openness on the knowledge supply side, with networks feeding in and recombining ideas from different sources;
- a well-articulated sense of end-user needs, achieved through high levels of consultation, involvement and co-creation; and

- a capacity for ‘ambidextrous working’ that enables both incremental and radical innovation processes, covering both systematic improvement of existing methods and approaches and more creative and entrepreneurial exploration of novel solutions and mechanisms to ensure the mainstream can assess and quickly assimilate new ideas.

The report finds the *humanitarian innovation ecosystem* contains a number of these necessary features, to varying degrees, in pockets here and there. But, in a number of critical ways, it falls some way short of the ideal. In particular, the report identifies the following issues:

- 1) Resource, information and capacity gaps, most notably in financing, information and skills, urgently need to be addressed. Resources need to be expanded and made more predictable, to provide end-to-end pathways for innovation; to become more diverse in their scope; and to be more tailored to specific innovation efforts.
- 2) Innovation information, or ‘intelligence’, needs to be strengthened, to make the case for specific innovations, to support innovation processes and to assess the efficacy of new approaches.
- 3) There is a need for concerted investment in innovation management skills and capacities. The sector needs to attract people with new skill sets and provide appropriate training for existing staff so as to enable those closest to the humanitarian ‘coal face’ to apply the best available knowledge to enhance operations.

<sup>1</sup> The research was conducted at the Centre for Research in Innovation Management (CENTRIM), Brighton Business School, University of Brighton. The work programme was built on three components: an extensive literature review, a programme of expert interviews and five detailed case studies looking at cash and food, water and sanitation, shelter, emergency disease responses and financing through the innovation ecosystem lens. The picture of the humanitarian innovation ecosystem presented in this report is a synthesis of the information generated in the three components of the research.

- 4) The innovation ecosystem is weakly integrated and needs active facilitation, networking and brokering of relationships between existing and new actors. A key priority is to strengthen and facilitate interactions and relationships across the ecosystem, both within and across sub-sectors.
- 5) Attention should be paid to how the innovation ecosystem can be made more open to new and excluded actors: end-users, scientists, private sector operators and non-traditional partners.
- 6) Innovation processes are idiosyncratic and subject to multiple interests and biases. Individual and group biases, institutional interests, marketing-driven agendas, fads and fashions all play a role in what gets picked up and used. There is little consistency or predictability as to how the ecosystem supports innovation processes. There is a need to strengthen innovation management processes across the ecosystem, to make them more objective and less partial to the vagaries of biases and fashions.

These issues are due in part to the relatively new and embryonic nature of the humanitarian innovation ecosystem. With sufficient and sustained investment in innovation *resources, processes* and *learning systems* from a diverse pool of actors, the ecosystem can be moved onto a more comprehensive, systematic and predictable footing. This report identifies six specific priorities for improvement, as follows:

***Priority 1: Address resource gaps and approaches.***

***Priority 2: Address the lack of innovation information and evidence.***

***Priority 3: Strengthen skills, capacities and enablers of innovation.***

***Priority 4: Strengthen and facilitate ecosystem interactions and relationships.***

***Priority 5: Strengthen innovation management processes.***

***Priority 6: Build a global alliance to strengthen the innovation ecosystem.***

Addressing these issues will be necessary to cement the role of innovation as a key element of aid effectiveness. If the sector does not adapt, capitalising on the opportunities afforded by the emerging innovation movement, humanitarian actors will have missed an opportunity to have more relevance, be more appropriate, have greater impact, ease more suffering and save more lives around the world.

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# Acronyms

<b>ALNAP</b>	Active Learning Network for Accountability and Performance
<b>ARC</b>	American Red Cross
<b>CALP</b>	Cash Learning Partnership
<b>CENTRIM</b>	Centre for Research in Innovation Management, Brighton University
<b>DFID</b>	UK Department for International Development
<b>DIV</b>	Development Innovation Ventures
<b>ECHO</b>	European Commission Humanitarian Aid and Civil Protection Department
<b>ELRHA</b>	Enhancing Learning and Research for Humanitarian Action
<b>FIND</b>	Foundation for Innovative New Diagnostics
<b>HIF</b>	Humanitarian Innovation Fund
<b>HMG</b>	Her Majesty's Government
<b>ICRC</b>	International Committee of the Red Cross
<b>IFRC</b>	International Federation of Red Cross and Red Crescent Societies
<b>IOM</b>	International Organization for Migration
<b>MSF</b>	Médecins Sans Frontières
<b>NGO</b>	Non-Governmental Organisation
<b>OCHA</b>	UN Office for the Coordination of Humanitarian Affairs
<b>OFDA</b>	Office of US Foreign Disaster Assistance
<b>R&amp;D</b>	Research and Development
<b>SPEED</b>	Surveillance in Post-Extreme Emergencies and Disasters
<b>TB</b>	Tuberculosis
<b>UK</b>	United Kingdom
<b>UN</b>	United Nations
<b>UNDRO</b>	UN Office of the Disaster Relief Co-ordinator
<b>UNICEF</b>	UN Children's Fund
<b>UNHCR</b>	UN High Commissioner for Refugees
<b>US</b>	United States
<b>USAID</b>	US Agency for International Development
<b>WASH</b>	Water, Sanitation and Hygiene
<b>WFP</b>	World Food Programme
<b>WHO</b>	World Health Organization



# Section 1: Background and Introduction

## 1 Introduction

THE CHALLENGES FACING INTERNATIONAL humanitarian action are growing in scale, scope and complexity. According to the UN Office for the Coordination of Humanitarian Affairs (OCHA),<sup>2</sup> in 2013 nearly 150 million people were affected by a combination of natural disasters, wars and conflicts, and the number of people needing assistance as a result of such challenges has more than doubled over the past decade. International humanitarian agencies are already struggling to meet these growing and increasingly complex needs. Without concerted effort, the gap between what is needed and what is provided is likely to grow in the coming years and decades.

In this context, many are calling for radical changes to both *what* humanitarian actors do and *how* they do it. Such changes have been called for in the past, of course, especially in the wake of high-profile humanitarian failures in the cases of Rwanda, the Indian Ocean tsunami and Haiti. But the current context of growing global needs is creating a 'burning platform' scenario for the sector. Put simply: humanitarians must adapt if they are to maintain their relevance, reputation and impact.

An increasing number of humanitarian agencies and researchers recognise the need for such change and have embraced ideas and principles of innovation. Starting with the landmark Active Learning Network for Accountability and Performance (ALNAP) study in 2009, a series of reports and policy statements have raised awareness of the role of innovation across the sector.<sup>3</sup> There has also been a rise in the number of initiatives focusing on innovation. These include the Humanitarian Innovation Fund (HIF), a cross-sector vehicle for providing grants at various stages of innovation processes; the UK Department for International Development (DFID) Humanitarian Innovation and Evidence Programme, which sets out the strategy for the UK government to support innovation; and the Humanitarian Innovation Project, an initiative of the Oxford Refugee Studies Centre that seeks to produce research and evidence on humanitarian innovation trends and issues.

Overall, these efforts have been able to:

- help raise the importance of innovation for achieving humanitarian goals;
- showcase and communicate numerous examples of successful innovation;
- generate specific initiatives to facilitate innovation, and
- help build understanding of the innovation process in the sector.

Thanks to this work, innovation is increasingly understood as a dynamic process involving search and discovery; invention, selection and development; implementation and testing; and scaling. It is seen as taking place within a complex system shaped by multiple actors, factors and interactions. This emerging body of work has provided the intellectual and operational foundations for the present report, which focuses on analysing, and providing ideas to enhance, the *humanitarian innovation ecosystem*.

The report draws on a year-long programme of research led by the Centre of Research in Innovation Management (CENTRIM) at the University of Brighton for DFID.

The overarching aim of the research was to move beyond the analysis done so far in the sector, with an explicit objective of analysing and assessing the system of actors and factors that shape innovation within the humanitarian sector. By developing an innovation ecosystems framework and associated analytical approaches derived from the field of innovation management, we have sought to move towards a thorough understanding of the challenges of humanitarian innovation, and how we might overcome them.

<sup>2</sup> OCHA (2015) *World Humanitarian Data and Trends 2014*. New York: OCHA.

<sup>3</sup> In chronological order, these include Ramalingam et al. (2009) 'Innovations in International Humanitarian Response'. London: ALNAP; HMG (2011) 'Humanitarian Emergency Response Review'. London: HMG.; DFID (2012) 'Promoting Innovative and Evidence-Based Approaches to Building Resilience and Responding to Humanitarian Crises: A DFID Strategy Paper'. London: DFID; ALNAP (2012) *The State of the Humanitarian System*. London: ALNAP; OCHA (2013) *Humanitarianism in the Networked Age*. New York: OCHA; DFID (2014) 'Promoting Innovation and Evidence-Based Approaches to Building Resilience and Responding to Humanitarian Crises: An Overview of DFID's Approach'. London: DFID; Betts and Bloom (2014) 'Humanitarian Innovation: The State of the Art'. Policy and Studies Series. New York: OCHA.

In order to explore the complexities underpinning the humanitarian innovation ecosystem, we established a project team that comprised both innovation management scholars and humanitarian aid researchers and practitioners.

Our work programme was built on three components. We started with an extensive review of the relevant literature in both innovation management and humanitarian innovation.<sup>4</sup> This component drew on the wealth of empirical studies available on successes and failures in innovation management. The resulting report tracks the evolution of the innovation management field, from basic concepts to the latest new frontiers. It also documents the emergence and evolution of innovation practices within the humanitarian sector and identifies the major opportunities and challenges. These latter include the development of *capacities* for innovation, the need for *ambidexterity* to enable both radical and incremental innovation,<sup>5</sup> the role of *entrepreneurship*, the potential for user-led and open innovation and the need to balance risk, reward and reliability across humanitarian innovation efforts.

In a second report,<sup>6</sup> we seek to generate insights from an informed sample of individuals who have expert knowledge of the role and nature of innovation and its management within the sector. Semi-structured interviews were conducted with approximately 50 informants, who included senior staff in donor organisations, governmental and international agencies and non-governmental organisations (NGOs), as well as management consultants, academics and private sector suppliers to the sector. This provided a qualitative view of the major factors and actors making up the humanitarian innovation ecosystem. The interviews explored key themes derived from the literature review and offered insights into why the humanitarian innovation ecosystem currently operates as it does. The report introduces the 'six Rs' framework, which this report uses, and provides guidance on the important enablers and inhibitors influencing the innovation ecosystem.

Together, these two reports also helped clarify and sharpen our analytical take on the innovation ecosystem itself, generating new ideas, concepts and frameworks for use in subsequent in-depth case studies.

Having reviewed the literature and gathered expert perspectives, we explored the humanitarian innovation ecosystem further in a series of in-depth case studies; this was the third component of our work programme. Four case studies were conducted, in the major humanitarian sub-sectors (i.e. water, sanitation and hygiene (WASH); food; health; and shelter); a fifth investigated the availability and models of humanitarian innovation financing (see Box 1). In conducting the case studies, we held over 150 interviews and reviewed numerous documents. We used a system dynamics model of the innovation ecosystem to explore each sub-sector.

Each of the five case studies was subject to multiple extensive coding exercises related to a four-stage innovation model and the 'six Rs' innovation ecosystems drivers, so that we might systematically identify common themes and issues.

The picture of the humanitarian innovation ecosystem presented in this report is a synthesis of the information generated in the three components of the research. This report synthesises and simplifies the ecosystem approach by integrating the 6Rs with a more traditional innovation funnel diagram. Through in-depth interviews and secondary sources, it identifies the major strengths and weaknesses currently apparent in the innovation ecosystem. It concludes with a series of recommendations on how the innovation ecosystem might be improved in the future.<sup>7</sup>

4 Bessant et al. (2014) 'Innovation Management, Innovation Ecosystems and Humanitarian Innovation'. Literature Review for the Humanitarian Innovation Ecosystem Research Project. Brighton: CENTRIM, University of Brighton.

5 Ambidexterity refers to the ability to manage both incremental and radical innovation.

6 Rush et al. (2014) 'The Components of the Humanitarian Innovation Ecosystem'. Interview Summary for the Humanitarian Innovation Ecosystem Research Project. Brighton: CENTRIM, University of Brighton.

7 The four stages of the model include search and discovery; select, invent and develop; implement and test; and scale. Although this framework may appear to follow a steady progression from ideas generation through to the optimisation of benefits, in reality there can, and often are, numerous iterations and feedback loops within and between the stages.

### Rationale for Case Studies

Each case study relates to one of the 'basic sectors' of humanitarian response, as addressed by humanitarian needs, financing allocations, coordination mechanisms such as the cluster system and standards of performance such as those codified in the SPHERE Minimum Standards in Disaster Response. They were also selected to illuminate different ways in which the humanitarian innovation ecosystem reflects diverse professional competencies and norms. By using shared analytical approaches and questions, we ensured each case study covered a range of common themes related to the different innovation stages and the 'six Rs' model.

**Cash programming**, for example, is perceived as being a rare example of a 'disruptive innovation' in the humanitarian sphere, with the potential to spread from food assistance to other aspects of humanitarian relief. It is clear, however, that there may be limits to the use of cash, and it may not be suitable under all conditions. This case was selected to generate a better understanding of the potential role of entrepreneurs in the sector and of how lessons can be learnt via experimentation. This is especially important given the wider context of food aid as the largest and most established of all humanitarian sub-sectors.

**WASH** is really three distinct, albeit overlapping, sub-sectors working together (to a large extent) within the same cluster. As such, it provided the opportunity to make comparisons between sub-sectors and to identify the extent to which they fit into different innovation management models and frameworks. Moreover, because of the belief among many that water 'has been sorted', with only limited advancements made in the area of sanitation, it allowed us to observe an ecosystem that was in transition in terms of its identification of needs, use of resources, etc. but that at the same time was unable, unwilling or unaware of the need to encourage more radical approaches to meeting user needs.

**Shelter** is also perceived as being rooted in a model of incremental change but, unlike in WASH, where there has been little criticism of this approach, this sector, perhaps more than any other in the humanitarian system, has inextricable links with long-term post-disaster development needs, disaster-proofing and the interaction of those affected by displacement with the provision of local services. Here, the focus is increasingly on process (and potentially paradigm) innovation as opposed the common perception of shelter as merely a product.

**Emergency disease response** gives a different perspective on the ecosystem, because the basic work in disease is undertaken in line with professional norms and standards of medical practice. There are also specific processes for innovation assessment and validation that made the health sector as a whole a very compelling sub-sector for examination. This case study was also very pertinent at the time of writing because of the on-going Ebola response, which was the focus of a major injection of cash and resources for innovations.

**Innovation finance** explains the key role of funding within the innovation ecosystem, and cuts across all of the sub-sectors. It was seen as important to look at how the distribution and concentration of funding might support or inhibit effective innovation processes. The case study involves examination of different models of financing innovation, and how well suited they might be to the processes and dynamics of humanitarian innovation.

## 2 What are Innovation Ecosystems?

SIMPLY PUT, INNOVATION IS creating value from ideas. The type of value will differ in different settings: in the business world, there is a value for customers, which is then reflected in shareholder value; in public and social settings, social and ethical value must also be considered, as well as wider interests. In humanitarian settings, as defined by the HIF, this value can be seen as deriving from ‘new or improved products and services, processes, positions and paradigms’, which, when successful, bring about greater value in the form of improvements in ‘efficiency, effectiveness, quality or social outcomes’.<sup>8</sup>

Such value creation does not happen automatically: there needs to be some form of process to bring about the transition. Early thinking about how this process worked tended to be simplistic, with linear views of the interactions between firms and customers – for example assuming that innovative technologies could be ‘pushed’ out to customers or customer demands would ‘pull’ ideas into new product development. Gradually, understandings of the innovation process increased in sophistication, recognising the role of multiple actors in the process and the importance of key relationships. By the 1990s, the idea of a *system* of innovation was emerging. This was of particular relevance to policy actors concerned with the effective and efficient operation of the innovation process. These actors included governments (local, regional and national), industry bodies, trade and business associations and firms whose concern was convening and operating supply and distribution networks around their core operations.

Characteristic of the systems view is the emphasis placed on innovation not as a solo act, but rather as a dynamic and emergent process that is the product of multiple actors and their interrelationships. The system includes a supply side (sources of knowledge, of finance, of skills, etc.), a demand side (end-users, articulated needs) and various mechanisms and agencies responsible for connecting these (brokers, developers, configurators, marketing channels, etc.). Importantly, the process is not linear; every stage has multiple interactions and feedback loops.

The US National Science Foundation provides a good working definition:<sup>9</sup>

*The people, institutions, policies and resources that promote the translation of new ideas into products, processes and services are generally recognized to comprise the innovation ecosystem.*

This shift away from thinking of innovation as a linear, sequential and predictable process into the conceptualisation of an innovation ecosystem has roots in the growing scientific understanding of complex social systems, and how change occurs in such systems. The growing use of this research and analytical framework in the study of particular sectors or regions relies on the incorporation of two key principles:

- 1) Understanding the different components of the innovation ecosystem: e.g. operations, research and development (R&D), manufacturing, marketing, intellectual property, regulation, networks and collaborations;
- 2) Understanding how these components interact and are interdependent, and how they support/inhibit the innovation process from the identification of needs/opportunities to the invention and development of new approaches, implementation and testing and diffusion and adoption.

Understandings of innovation ecosystems have continued to evolve. By the early 2000s, the innovation discussion had shifted to recognise not only the multiple actors and coproduction but also the potential role of *open innovation*, further blurring the boundaries of the system. A core principle of open innovation is that ‘*not all the smart people work for us*’ – a logic that drives organisations to extend their knowledge networks to allow for flow of ideas into and out of their operations.

<sup>8</sup> <http://www.elrha.org/hif/innovation-resource-hub/innovation-explained/introduction-innovation/>

<sup>9</sup> [http://www.nsf.gov/news/special\\_reports/i-corps/ecosystem.jsp](http://www.nsf.gov/news/special_reports/i-corps/ecosystem.jsp)

There has also been growing recognition of the potential for *agile innovation* approaches, in which the innovation process is seen as a continuing series of learning loops, involving experimentation with early prototypes and learning and co-creating with users, in an approach sometimes called *perpetual beta*. These models originated in the field of software development but have diffused widely across other sectors.

A parallel trend has been the growth in *user engagement*, in which end-users, be they front-line workers or customers, are able to shape, configure, customise and increasingly co-create innovations. With enabling technologies allowing access to and communication among these end-user groups and a trend towards greater social networking, this has generated another powerful trend in innovation systems work.

## 2.1: Different ecosystems and approaches

There are many different analytical tools for exploring innovation ecosystems. Quantitative methods for complex systems analysis – from system dynamics to network analysis, agent-based simulations and data science/big data – have all been used to deepen understandings of particular innovation ecosystems. There is also a wealth of literature that uses qualitative approaches to understanding and enhancing innovation ecosystems. Differing interests of researchers, analysts and policymakers have naturally meant different studies have emphasised different features of the innovation ecosystem under study.

Each innovation ecosystem is a unique entity, and differences between innovation ecosystems occur for diverse and complex reasons. Some seem to have developed naturally, whereas others have undergone a more managed evolution. Each will, of course, face its own challenges.

However, as we discussed in the literature review for this project, a number of common features can be identified in the most effective innovation ecosystems.

Such ecosystems are characterised by:

- a clear sense of overall strategic vision around which to focus search and selection behaviour;
- a sufficient supply of key resources – especially finance and human resources – and clear routes to enable these to flow into the system;
- a high level of openness on the knowledge supply side, with networks feeding in and recombining ideas from different sources;
- a well-articulated sense of user needs delivered by high levels of user consultation, involvement and co-creation; and
- a capacity for ambidextrous working to enable both incremental and radical innovation processes – entrepreneurial exploration of novel solutions and mechanisms to ensure the mainstream can quickly assess and assimilate ideas evolving in this context.

Clearly, important lessons and pointers for improvement could be adopted from benchmarking against other ecosystems. However, there is also a danger in attempting to mimic all of those best practices observed in other private or public sector innovation ecosystems. And, while it seems logical to look to market economy or other public sector innovation ecosystems for standards to which humanitarians should aspire, we must keep in mind that there are significant differences in the historical drivers and current landscapes between these other systems and the humanitarian sector. An inaccurate picture of the context in which the humanitarian system operates will only lead to innovation policies and practices that blindly adopt solutions in an attempt to fit square pegs into round holes.

For example, we might look to military innovation, funded by governments and executed by a variety of public and private sector actors, as a source of useful ideas – but any drawing of lessons would need to take into account factors as diverse as:

- differences in goals;
- the varying cultures, incentives and mind-sets in the two sectors;
- the considerable difference in available resources;
- the emphasis placed on training and skills; and
- the relative maturity and awareness of innovation as a concept and a practice.

In addition, comparisons and the drawing of lessons from pure private sector ecosystems may be limited by the lack of effective market mechanisms within humanitarian assistance. Humanitarian aid is not, nor should it be seen as, a market transaction based purely on the ability of consumers to pay for goods and services.

## 2.2 The University of Brighton approach

This approach focuses on the innovation ecosystem that works to improve humanitarian aid responses. As noted above, the context of innovation in the humanitarian sector is clearly different from what it is in other ecosystems. As this report details, there are significant challenges to face in assuring a systematic and efficient flow of innovation to meet the needs of humanitarian response. However, it should be borne in mind that the sector is certainly no stranger to innovation. Efforts of pioneering humanitarians such as Clara Barton, founder of the American Red Cross, built on their ability to identify new and creative solutions to desperate situations. Today, examples can be found in every humanitarian response in every part of the world.<sup>10</sup>

Of course, the humanitarian sector encompasses a wide range of activities. It was in order to reflect this breadth that we conducted in-depth explorations looking across a number of aid sub-sectors. Within each of the sub-sector case studies, it was possible to observe the concepts of innovation ecosystems being

used in different ways and examples of where the ecosystem seemed to work well.

These examples include:

- *a network of actors cooperating in innovation with a given firm or organisation* – such as teams working within specific medical charities to develop new protocols and tools for use in emergency disease responses;
- *a geographical or thematically focused area of high innovation density* – such as the development and trialling of specific cash-based innovations by public sector actors, humanitarians and financial firms working in response to the Indian Ocean tsunami;
- *a network of loosely coupled actors with differing interests but bound together in a collective whole, therefore sharing a common ‘innovation fate’* – such as the small group of NGOs and agencies facilitated by the HIF that implemented a structured process to identify specific areas of need within the WASH sector; and
- *a system of all relevant innovating actors and factors making up a sector’s innovation efforts* – such as the role of the World Humanitarian Summit Innovation Advisory Group in convening key policymakers, thinkers and researchers in the humanitarian innovation space.

In developing the approach, the project team identified a number of components of the ecosystem that would need to be explored more thoroughly in order to obtain a fuller picture of why the humanitarian innovation ecosystem currently operates as it does. These components included the following ‘six Rs’:<sup>11</sup>

- **Resources:** What resources (finance, time, knowledge, technologies) are available for humanitarian innovation, and how are these deployed?
- **Routines:** What are the specific ways in which innovation processes work in the sector, and how well do they work? What are the dynamics of these routines – for example linear, predictable; non-linear, unpredictable?

<sup>10</sup> See ALNAP case studies – <http://www.alnap.org/resources/innovations> – and HIF case studies – <http://www.elrha.org/hif/innovation-resource-hub/hif-project-case-studies/>

<sup>11</sup> These were drawn and adapted from USAID (2014) Local Systems: A Framework for Supporting Sustained Development. Washington, DC: USAID.

- **Roles:** Who plays what roles in innovation efforts and processes? Are there observable patterns? What, specifically, are the roles of innovators, end-users, front-line workers, brokers, researchers, the private sector and non-traditional actors?
- **Relationships:** What kinds of relationships and networks exist between actors in the innovation ecosystem (competitive, collaborative, contractual, commercial, etc.), and how do these shape innovation efforts?
- **Rules:** What formal and informal rules pertain to humanitarian work and humanitarian innovation specifically, and how do they serve to shape roles, determine relationships and resource allocations and shape innovation processes?
- **Results:** How do innovation results get determined, and by whom, and what impact does this have on the success or otherwise of innovations?
- **Implementation and Testing:** Plausible solutions should then be trialled in real-world settings, often through small-scale pilots. This will see some solutions fail and others move forward.
- **Scaling:** This set of activities will see solutions in widespread use, through a variety of mechanisms, from open-source dissemination to replication, incorporation into government structures and commercialisation.

By integrating these two sets of ideas – the ‘six Rs’ of the ecosystem and the four stages of innovation management, underpinned by the system dynamics framework – the team was able to develop and employ a simple and powerful visual framework that helps explain how the humanitarian innovation ecosystem works. This integrated framework shows how we chose to incorporate and integrate the two elements of innovation ecosystems approaches – the different components of the ecosystem and their interactions/interdependence – into this study.

The team also made use of the principles and concepts of system dynamics to develop a working model of how the innovation ecosystem should function in practice. By analysing innovation as a systemic process, we were able to better understand how the different components of the ecosystem of actors and factors map onto key stages in the innovation process, and identify areas of strength and weaknesses. The system dynamics model presented a very detailed picture of the innovation process, highlighting critical interdependencies and factors that enabled and inhibited the process of innovation. These findings were then been mapped onto a generic four-stage innovation funnel for the sake of clarity and simplicity.

- **Search and Discovery:** This stage is composed of rising concern about a given issue or problem, which then motivates a search for possible solutions.
- **Selection, Invention and Development:** Successful search processes should lead to new solutions being invented and tested in ‘laboratory’ conditions.

Figure 1 shows the different stages of the innovation process, as a ‘funnel process’, and each of the ‘six Rs’ that make up the ecosystem. It shows how each of the ‘Rs’ inhibits or enables the successful progress of innovations from one stage to the next. By use of a ‘traffic light’ system, we are able to indicate how each of the ‘Rs’ works to enable innovations to move through the corresponding phase of innovation management. The figure gives an illustrative example of what such a system might look like. Red is indicative of strong inhibiting factors, amber of some evidence of effective practice and green of the existence of good practice and effective enablers.

Across these stages, the ecosystem should in theory work to bring together sufficient resources and actors playing a diverse range of required roles and with effective relationships. These should look to apply appropriate routines, in accordance with a range of rules, in ways that generate effective results and thereby enable innovation processes to move forward, overcoming institutional or professional barriers to new approaches. The prevalence of ambers and reds in the diagram below indicates where the illustrative innovation ecosystem is not performing optimally.

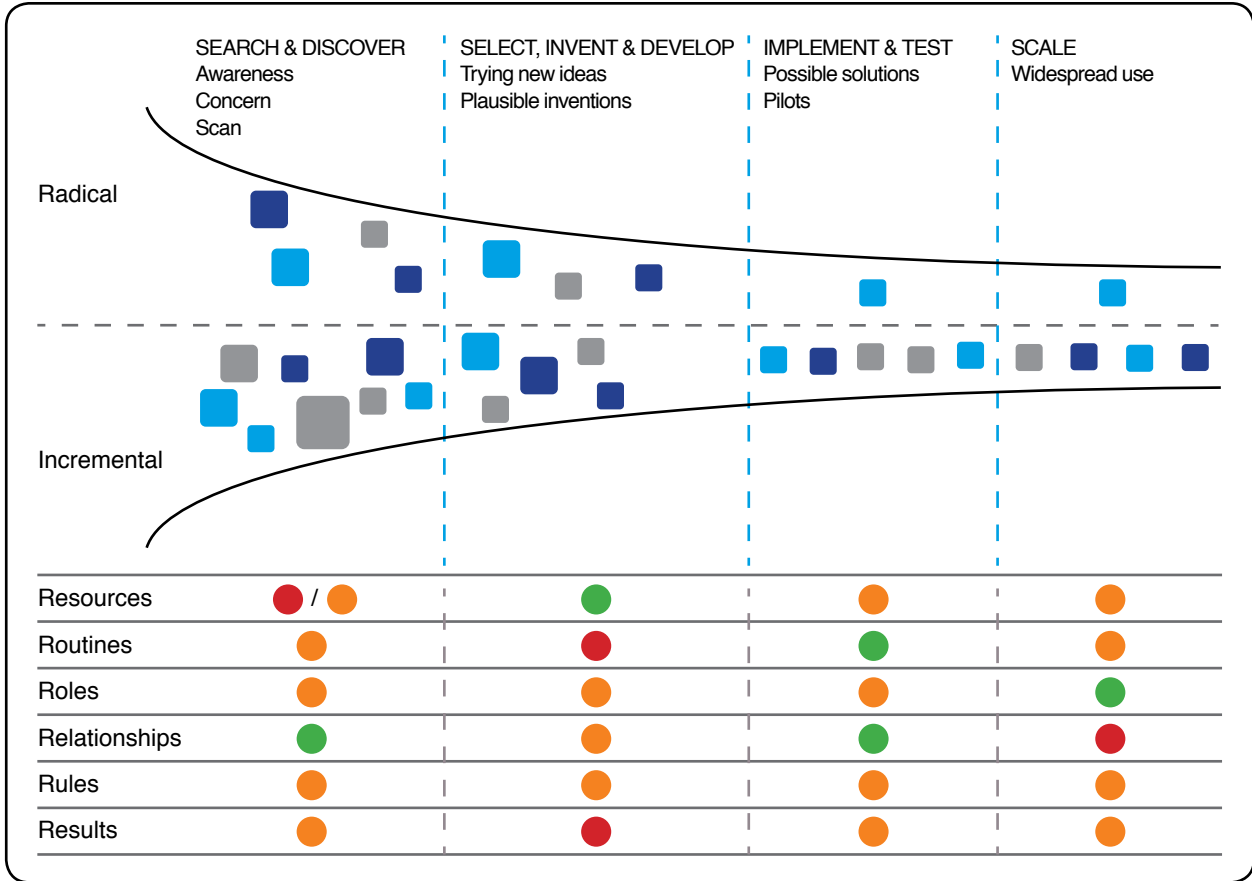


Figure 1: Innovation Ecosystem – illustrative example



## Section 2: Findings

THE LITERATURE REVIEW PROVIDES the theoretical framework and the ‘filter’ through which this study was undertaken and the interview survey provides validation of the key elements of the innovation ecosystem on which our analysis is based. Although there is inevitably a degree of subjectivity within the assessments the research team decided on, the empirical basis for our findings about the innovation ecosystem comes in large part from the five in-depth case studies, described in more detail in Appendix I, and the in-depth interviews conducted throughout the project.

We present an overview of this material in Chapters 3 through to 6. Each relates in turn to one of the four stages of the model and identifies strengths and weaknesses related to each of the ‘Rs’. In addition, in the introduction to each stage, we provide an indication of the type of activities we would expect to find in an efficiently functioning innovation ecosystem during that stage. We also give our assessment of the ‘traffic light’ status for each of the ‘Rs’ and build this up for each stage in turn.

### 3 Search and Discovery

THIS STAGE IS TYPICALLY described as being composed of rising awareness or concern about a given issue, problem or opportunity, which motivates some form of search for possible existing solutions and the discovery of new solutions. The relationship is two-way: while awareness can lead to efforts to search for and discover solutions, in some cases a serendipitous discovery can trigger more systematic and thorough search processes.

An effectively functioning innovation ecosystem would have the following features:

- a means by which multiple actors can resource the search and discovery process;
- processes and routines for identifying areas where new ideas are needed and for agreeing the scope of search and discovery efforts;
- a means for conducting intentional, systematic and frequent scans of existing ‘fringe’ ideas as well as scanning externally from customers, competitors, suppliers and other sectors;
- a means for generating new ideas including ‘outside the box’ creativity-enhancing tools and processes;
- efforts to ensure all voices are heard – especially end-users and others directly engaged in the delivery of products and services;
- investment in the capacities of individuals and groups who are licensed to explore the possible solutions and bring radical new ideas into the system; and
- shared criteria and means for verification for assessing the success of search and discovery processes.

#### 3.1 Are there sufficient resources for search and discovery?

Across the five case studies, it was apparent that there were few dedicated and routine resources available for search and discovery activities. This is not to say there are no regular assessments of the suitability of existing processes and approaches. Every major disaster triggers both informal (through social networks) and formal (through evaluations and reports) acknowledgement of both the successes and the limitations of standard operating procedures. While evaluations and reports do of course require resources, they are not consistent in their coverage of innovation gaps and opportunities. There is an

important tradition of improvisation in the sector, in developing solutions at the point of need in difficult circumstances. But these solutions emerge on an *ad hoc* basis and rarely diffuse more widely; much of the learning and potential transfer to wider application is lost.

There are also a few instances where there have been investments in formal assessments of the needs and opportunities for innovation. These tend to be sector-specific, and can be based on a general assessment of performance in that sector. For example, an influential UN Office of the Disaster Relief Co-ordinator (UNDRO) report spelt out challenges in shelter responses in 1982, many of which were reiterated in a expert assessment over 20 years later, and which carried implications for innovation (or the lack of it) in that sector.<sup>12</sup> Other examples, including the Enhancing Learning and Research for Humanitarian Action (ELRHA)'s 2013 systematic review of evidence for humanitarian health, can highlight gaps in research and provide a useful proxy for innovation needs. Along similar lines, there were examples of wider public health challenges – such as the lack of an effective test for tuberculosis (TB) and the potential of ante-retroviral treatments in emergencies – where assessments and advocacy efforts *outside* of the humanitarian sector had influenced the awareness of need and of the potential for innovation *within* the sector.

A few systematic assessments have addressed humanitarian innovation directly – such as the WASH gap analysis of 2013,<sup>14</sup> and various stock-takes undertaken by the Shelter Centre when it was still operating. Some organisations also undertake sector-specific challenge assessments.

However, while this work very usefully serves to raise levels of concern, the sector as a whole has a very short memory. There are also few means of institutionally anchoring such analyses into the sector, such that they are repeated on a regular basis and are able to tell an evolving story about innovation needs and opportunities. This is compounded by the short-term nature of humanitarian deployments, which places restrictions on continuous and cumulative learning, regardless of the topic.

There is also little evidence of resources being made routinely available to convert such understanding into a process of search and discovery for alternative approaches. There are some exceptions to this, which tend to be institutionally focused or crisis-specific. For example, an internal water and sanitation stock-taking exercise by the UN Children's Fund (UNICEF) was followed by dialogue with investors and universities to scope out possible solutions.

Elsewhere, the Ebola crisis in West Africa drove concern around critical response and treatment gaps, including the search for new solutions, the need to undertake research into critical challenges and financing to take new ideas into production and scale. Here, the humanitarian innovation effort benefited from the considerable resources available for health innovations globally. However, it is not clear that such resources will be made available more generally for humanitarian health responses, or even for Ebola-focused innovations on a longer-term basis.

This study found few instances of regular and predictable investment in the mechanisms, skills and capacities to undertake search and discovery work for humanitarian innovation. Where new ideas and products have been matched to specific problems, it tends to happen in a scattergun, crisis-specific and somewhat idiosyncratic fashion – shaped more by the vagaries of chance and happenstance than by the systematic analysis of needs and strategic use of resources.

Again, some exceptions are emerging. DFID has recently sought to work with innovation management specialists IDEO.org and open innovation platform OpenIDEO to scan for new ideas and approaches in emergency education efforts under the Amplify programme. This will use a crowd-sourced search mechanism to generate a wide range of ideas that will then be gradually whittled down to fundable ideas. There is also work underway to run an operational research effort to identify new ideas and approaches to enhance sustainable energy access and management in humanitarian interventions, with a focus on refugee camps and informal settlements.<sup>16</sup>



**Rating: Red/Amber**

12 UNDRO (1982) 'Shelter after Disaster, Guidelines for Assistance'. Geneva: UNDRO.

13 Blanchet et al. (2014) 'An Evidence Review of Research on Health Interventions in Humanitarian Crises'. London: LSHTM

14 Bastable and Russell (2013) 'Gap Analysis in Emergency Water, Sanitation, and Hygiene Promotion', London: HIF.

15 <https://openideo.com/challenge/refugee-education/research>

16 <http://www.chathamhouse.org/about/structure/eer-department/moving-energy-initiative-project>

### 3.2 Are routines for search and discovery in place and appropriate?

There are no consistent or formalised processes, within or across sub-sectors, for search and discovery. This gap is evident both in efforts to identify the needs and opportunities for innovation and in scanning/discovering new and alternative approaches.

The innovation *needs and opportunities* assessments identified previously have all been one-offs rather than routine and systematic. Some are sector-focused; others are small-scale efforts triggered by particular crises – for example the spate of studies that sought to explore urban challenges after the Haiti earthquake. While such assessments are increasing in number, they are not always connected to each other, which limits the scope for methodological learning. The lack of any planned, regular follow-up also means there is no indication of whether innovation needs and opportunities have been met over time, to what extent and with what results.

Moving beyond needs and opportunities to the processes and methods of search and discovery revealed further gaps. Innovation gap analyses, when they are done, do not always lead to efforts to look for or discover possible solutions. There are exceptions to this: the 2012 WASH gap analysis for HIF was followed by a process of search that was collaborative in nature, and sought to bring together actors to accelerate the innovation process.<sup>17</sup> Here, an innovation consultancy firm undertook a scan for possible products and approaches that might fill the identified gaps. Subsequent to this, HIF collaborated with the open innovation network InnoCentive to develop specific challenges that the network of ‘solvers’ might address. This process also served to trigger processes of scanning and invention of possible solutions.

Formal innovation techniques such as horizon scanning, forecasting and product searches are alluded to in various circles but are not generally very widely used in the sector. Interesting exceptions, beyond the HIF work described above, include recent work led by the Red Cross movement on *emerging technologies*, which has sought to match new technological platforms with the needs of disaster

resilience programming.<sup>18</sup> Also of relevance here is the work by the World Health Organization (WHO) and the Foundation for Innovative New Diagnostics (FIND) network to set out technical product specifications for new Ebola tests, which have subsequently been circulated widely to the market to trigger processes of invention. In the emergency sanitation context, a series of conferences and workshops led to the development of priorities for improvement and detailed product specifications, which were then taken forward by the Office of US Foreign Disaster Assistance (OFDA)-funded Emergency Sanitation Project for piloting specific innovation processes.

There are a number of institutionalised routines for the sector as a whole, into which search and discovery of innovation have, to some extent, been incorporated. For example, numerous processes for operational learning are used in a variety of ways around the sector, ranging from after-action reviews to real-time evaluations. *Ex-post* evaluations of crises are also a potential source of search and discovery efforts. However, it seems that many evaluations tend to be focused more on accountability, or *proving* responses were effective, and less on learning, or *improving* responses.

To support search and discovery, evaluations would need to incorporate additional assessment criteria based explicitly on innovation needs, opportunities and activities. There are examples of this working well, such as the Disasters Emergency Committee Haiti Evaluation, which was noteworthy for its assessment of the need for innovation in urban responses.<sup>19</sup> This does need to be done with care, however, as bringing innovation concerns into evaluations may risk placing additional analytical demands on what already tend to be much overloaded processes, and turn innovation coverage into a ‘tick-box’ exercise.

Because of this, the focus is more on the shortfall in practices, and how to correct them, rather than giving a bigger-picture view of the possibilities and opportunities for change.

These operational learning processes also tend to draw predominately from the perspectives of humanitarian actors, to the neglect of insights and ideas from direct operational counterparts partners

<sup>17</sup> Bastable and Russell (2013).

<sup>18</sup> ARC and IFRC (2015) ‘A Vision for the Humanitarian Use of Emerging Technology for Emerging Needs: Strengthening Urban Resilience’. Washington, DC, and Geneva: ARC and IFRC; <http://tech4resilience.blogspot.co.uk>

<sup>19</sup> James and Dargis (2013) ‘A Study on Protection and Accountability in Haiti following the Earthquake in January 2010: Findings from the Field’. London: Disasters Emergency Committee.

such as national governments, implementing partners and disaster-affected communities. More distant stakeholders such as the private sector, scientists and the military tend not to have any kind of input into learning initiatives. The focus and scope of operational learning activities mean the innovations and changes they trigger are decidedly more incremental than radical in nature.

The routines for search and discovery are not just technical, as we found in the disease response case study. Accompanying many successful innovations has been a process of advocacy, communication and outreach to convince others of the inadequacy of current approaches and the possibilities of novel approaches. Where such efforts are undertaken, they serve to move from concern to making the case for change.



**Rating: Amber**

### 3.3 Are all roles understood and being played?

In many contexts, the source of signals about innovation needs and opportunities comprises front-line workers, national counterparts and end-users. These roles are critical for both raising concern and triggering search and discovery processes. However, in many settings, external actors' opinions are not systematically sought. While there is engagement with national and local actors by operational necessity, the learning from such efforts is restricted by the attitudes, culture and processes of humanitarian organisations. Even in those settings where an international organisation does learn effectively from national counterparts, the shelter example illustrates all too well that lessons are seldom disseminated to the wider community. End-users or recipients of aid are effectively shut out altogether, and there are very few examples of innovation processing bringing in the attitudes and perspectives of aid-receiving communities. Cash is the obvious and major exception to this: communities' preference for money over food, and their willingness and ability to use cash for recovery, was a major part of the justification for expanding such work.

Wider innovation management experience suggests involving end-users helps not only shape the emerging innovation to suit the need conditions more effectively but also accelerate diffusion, because key issues of compatibility have been addressed at the design stage. Additionally, early and active end-users (*lead users*) demonstrably play a powerful role as opinion-leaders influencing the adoption of behaviour by the wider majority.

Although, as previously noted, there are processes for operational learning, reflection is not consistently encouraged or supported among front-line aid workers. There have been some positive developments to systematise front-line operational learning, but, as with processes for operational learning, these tend to be focused on 'doing things right' and less so on questioning the viability or otherwise of existing standard operating procedures – that is, 'Did we do the right things?'

In looking for patterns in signals, there is usually a need for some kind of coordinating mechanism to collect and synthesise information. Where this does happen, it is usually at the behest of research-based organisations or other networks, supported by operational organisations. Some operational organisations, by dint of their focus and reputation, are more likely to be involved in coordinating and leading such efforts: Oxfam and UNICEF with WASH; the International Federation of Red Cross and Red Crescent Societies (IFRC) and the UN High Commissioner for Refugees (UNHCR) with shelter; Médecins Sans Frontières (MSF) and WHO with health and diseases; the World Food Programme (WFP) and World Vision with food and cash; and so on. There is growing evidence that the UN cluster system, which works to coordinate assistance in particular crises and globally, can start to play such a coordination role for innovation-focused assessments. At present, some clusters (especially WASH) are placing a strong emphasis on new and possible innovations; others are doing rather less.

The role of academia, science and innovation specialists is also critical in undertaking search and discovery directly. Indeed, when there have been successful examples of search and discovery, it is often because of the combination of front-line and end-user perspectives with systematic research efforts. However, efforts to ensure external experts are brought in to explore the possibilities for innovation are insufficient. The wider experience of innovation

management offers powerful evidence of the potential of amplifying search efforts through using *open innovation* approaches. Importantly, there are now a rich variety of routes to access external knowledge and experience and potential for the humanitarian sector to learn and adapt these models.

Even where external agents are involved, the existing ways that humanitarians have of engaging these actors can keep them some way from the ‘coalface’ of operations – for example undertaking more open-ended studies, commissioning them to do evaluations and so on. The lack of sustained engagement, driven by the short-termism that is characteristic of humanitarian work, is also apparent, especially in the shelter sector.

As a result, few if any roles have a licence to explore the potential and scope of innovation. Where this has happened successfully, it is because humanitarian actors have specified some minimum conditions for new products and processes, and invited other actors to share their potential solutions. Examples include WHO–FIND’s work on an Ebola test. This signal can help generate a small-scale market for search and discovery and trigger creative exploratory efforts. However, in this case, it is interesting to note that the signals have not been accompanied by the means and ability to test and compare the viability of different inventions that have been forthcoming. In market terms, there is capacity to trigger variation of approaches, but not for selection, which then limits the scope for downstream dissemination.

Because of the lack of a licence for exploration, this usually happens through ‘maverick’ operators who attempt to carve out such spaces. This was especially apparent in cash-based programming, where individuals and groups seen as challenging to the mainstream of the sector led early experiments. Indeed, some with long experience of the sector noted that using cash programming in the 1980s was enough to be ‘blacklisted’ by the major food security

organisations. Some humanitarian organisations also seem to have fostered a culture of supporting such entrepreneurship within specific sectors; MSF in health and Oxfam in WASH are notable examples. Here, the organisations themselves have something of an entrepreneurial maverick reputation in the sub-sector, making it easier for individuals to play such roles.

In some sectors, most notably shelter, external operators – be they private firms, academics or individuals – can undertake extensive search and discovery efforts that are based not on specifications received from the humanitarian sector but on providing solutions to perceived needs. In shelter in particular, this can lead to products that are not aligned with the contexts in which they are used and therefore do not effectively meet humanitarian needs. Such external experimentation is less evident in sectors such as disease response and WASH, where the barriers to entry, in terms of technical expertise or costs of prototypes, are high. In these other sectors, however, there are examples of parallel innovation processes that can be of benefit in humanitarian responses. Examples include the range of actors who play an active role in health and disease innovation, for example in the development of a low-cost meningitis vaccine, which operational organisations have successfully deployed. Along similar lines, the Bill & Melinda Gates Foundation ‘Reinvent the Toilet Challenge’ is seen as having raised the profile of sanitation and made humanitarian innovation in this space more credible. The role of these ‘peripheral’ players is clearly important, but is also very varied across sub-sectors.

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**Rating: Amber**

### 3.4: Are relationships in place and functioning?

The roles the diverse actors should play in search and discovery also require good relationships between these actors. It is interesting to note that, in some sectors, informal networks of relationships mean relationships do not need to be crafted anew for each process of innovation. However, for the most part, the relationships for search and discovery are formed 'on the fly'. This can make these efforts challenging, because the foundation of common understanding or trust that is needed for successful innovation is not necessarily in place.

Moreover, *existing relationships* within the humanitarian sector can work to inhibit the kind of interactions that will permit an open and honest assessment of innovation needs/opportunities. The contractual relationships between donors and implementers, and between implementers and national partners, do not always have the scope for exploring possible solutions and ideas within humanitarian operations. Instead, there is pressure for implementers to provide certainty on what will be done and how. This can lead to institutional acceptance of standard operating procedures, underpinned by an unwillingness to question things because of the implications this carries for funding flows.

Such contractually focused relationships shape innovation processes in a number of ways. The first is that, if applied unthinkingly to innovation efforts, such processes can bring about the same tensions in innovation as in humanitarian delivery writ large. For instance, such arrangements, if used to commission search and discovery assessments, can push findings in areas that are less ambiguous and more certain, and can generate more incremental conclusions about change. The weight of these existing relationships can influence innovation at the level of culture and mind-set: they may make search functions very inward-looking and sector-focused, thereby retaining an emphasis on what is feasible within the current delivery infrastructure and arrangements.

There are some interesting examples of relationships and structures being established that could have the potential to support more exploratory search and discovery efforts. Foremost of these are the global clusters, which in WASH do provide a common focus for problem-solving and information-sharing. HIF work in WASH has built on these relationships to good effect. There are also other mechanisms – some of which may be standing networks: the role of the Cash

Learning Partnership (CALP) in bringing together, sharing and disseminating experience and knowledge around cash-based programming is a good example.

More one-off examples are also apparent. For example, after the worrying resurgence of polio in Syria in 2013, a regional forum for major response agencies was held in August 2014, with the specific goal of sharing and reviewing innovative strategies for polio control and management. However, there are some risks here, in that these mechanisms can be perceived as a 'closed shop' of the 'usual suspects' of actors with long experience in the sector. Insufficient diversity of participants makes idea generation more likely to be incremental in nature and focus.

Also of relevance here are specific actors who are seen as standard-bearers in the sector. Many of these actors are in the UN system, and some, such as WHO, do indeed have a formal role to play in validating search and discovery efforts, through their evidence synthesis and approvals process and related panels. For others, such as UNHCR, WFP and UNICEF, the role is more informal and loosely defined.

Actively searching for new users for feedback and new partners for ideas is vital for search and discovery. This tends to happen in very limited ways at the present time, at the margins of the system. But it can happen. Positive examples include the development of the national mobile-based disease surveillance system in the Philippines, which came about because of engagement between the WHO country office and the Ministry of Health, which then generated a network of actors working together to develop the surveillance system, to test and deploy it and to take it to national scale. The role of the humanitarian sector lay in providing finance, capacity and training.

However, it is worth noting that the existence of diverse networks does not always lead to effective search and discovery efforts. The opportunity or potential for new ideas from such networks is clear, and there are numerous examples of the global shelter community of practice, such as the Crisis Mappers network and Information Systems for Crisis Response and Management, in technologies for crisis response. But there is always a further challenge to ensure the creative energies of such groups are effectively harnessed in pursuit of specific innovation challenges.

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**Rating: Red**

### 3.5 Are the rules supportive or restrictive of the operation of the ecosystem?

Rules and norms are widespread across the sector, but only a few directly shape search and discovery efforts. Informally, the conservatism of the sector can mean it is unlikely that operational agencies themselves will lead assessments of the needs and opportunities for innovation, at least not without some external trigger or engagement from networks, donors or other third parties. More generally, as the shelter sector illustrates, the demand for accountability and standards can have an impact on willingness to take risks.

More directly on processes of search and discovery, no rules or guidelines exist on how such efforts could best be undertaken, with what methods and how findings might be verified, updated and refreshed. Perhaps most importantly, there is no clear sense of how such efforts will be utilised in decision-making around innovation investments.



**Rating: Red**

### 3.6 Are good, credible results being generated to support effective decision-making about innovation management processes?

In the innovation-focused needs and opportunity assessments that have been undertaken to date, data and evidence quality tends to be very uneven. Some efforts in this space have employed systematic evidence reviews of practices in a given sector such as health, which, as noted above, can be used as a proxy for innovation needs. In such cases, the analysis is subject to rigorous academic standards. Other exercises have been stakeholder surveys or opinion-gathering exercises. Here, data quality may be more problematic, leaving such assessments open to accusations of bias when it comes to drawing conclusions about innovation needs.

It is interesting to note that these have few means of triangulating different data sources. For example, opinion-gathering is seldom subject to validation and verification, whereas systematic reviews (found predominately in health) may lead to an assumption that innovation gaps can be identified through analysis of peer-reviewed journal articles, which may not hold true across all sub-sectors and operations. One could argue that the ultimate results of search and discovery efforts should be in the feedback from end-users. It is worth highlighting that, as observed in the food case study, the evidence for cash as a viable option emerged alongside a greater research focus on aid recipients' lives and livelihoods, as well as a greater focus on needs assessments. But this does not happen as a matter of course.

More sophisticated approaches to ensuring quality of results in innovation identification and search, such as design thinking, forecasting methods, product inventory and benchmarking and horizon scanning approaches, have not been applied extensively in the sector, if at all.



**Rating: Red**

### 3.7: Summary of search and discovery

Figure 2 shows graphically the results of our analysis of the search and discovery phase.

The analysis shows that the humanitarian innovation ecosystem faces critical issues in search and discovery. Low and unpredictable investment, a lack of repeated routines and clear roles and poorly functioning relationships are compounded by a lack of policies and frameworks for raising issues and scanning for solutions and few, if any, means to assess results. Although this does not necessarily mean subsequent innovation processes will be problematic, the lack of effective search and discovery creates numerous problems, which are 'kicked down the line' in the innovation management process. For example, lack of clearly defined success criteria for searches at this early stage can mean solutions are generated with little or no connection to the concern raised; there is therefore no guarantee the solutions will be relevant.

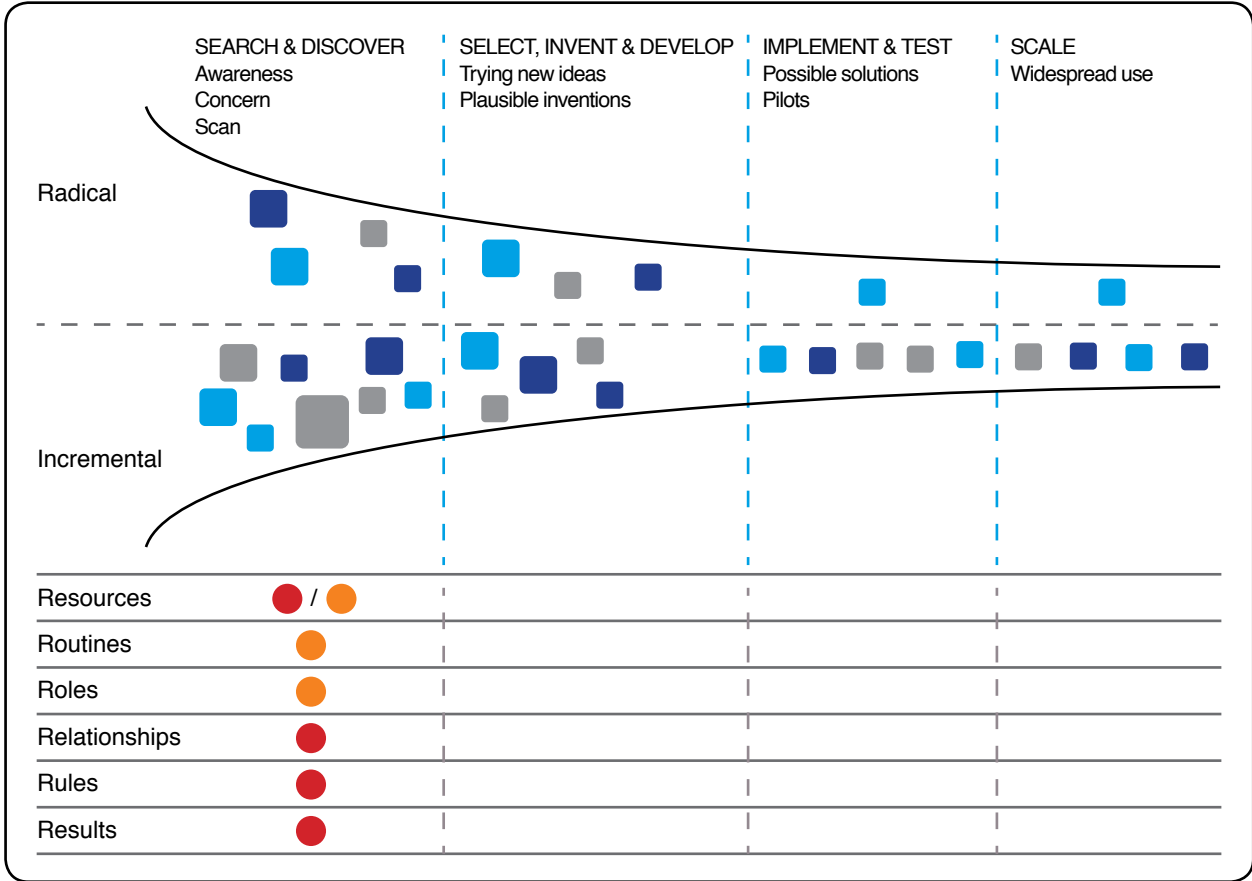


Figure 2: Innovation ecosystems – search and discovery



## 4 Selection, Invention and Development

Successful search and discovery processes should lead to new solutions being selected or invented and subsequently developed in realistic test or laboratory conditions.

An effectively functioning innovation ecosystem would have the following features:

- defined funding streams to support and facilitate search, invention and development work, as well as to support promising entrepreneurs;
- means by which the results of search processes can be subject to ‘proof-of-concept’ assessments before undertaking detailed investigations;
- processes for channelling and harnessing invention processes to target problems where existing solutions do not pass proof of concept;
- early involvement of key players, concurrent working and cross-functional knowledge-sharing in the invention and discovery stages, and good networks to enable generating and sharing of ideas; and
- application of defined success criteria, critical thinking, notions of ‘minimum viable product’ and implementation protocols to systematically assess the potential added-value of ideas as well as risks and benefits, to turn proof-of-concept ideas into valid and testable plans.

### 4.1 Are there sufficient resources?

In recent years, resources have been directed towards the selection and development of new inventions across all of the sectors looked at for this study. For example, the small grants programme of the HIF has been open to supporting search and discovery, with some of the projects then moving forward to further testing and implementation. As well as such general and open windows, there are sector-specific windows, some of which are cross-organisational, such as the OFDA-funded Emergency Sanitation Project; others are internal to specific organisations, such as WFP’s

innovation fund for food assistance. There are also more challenge-based windows, such as the HIF’s WASH collaboration with InnoCentive, which seeks solutions to defined problems. A number of these challenge-based windows were triggered by the Ebola outbreak; an example was the design of a low-cost protective suit.

These examples illustrate the growing allocation of both attention and financial resources to selection and invention. They also serve to illustrate the diversity of approaches to encouraging and fostering effective inventions.

However, these resources are not sufficient, in terms of either the amounts of funds made available for specific inventions or the breadth of the resource availability across different challenges and issues. In terms of amounts of funding, the majority of innovation funds in the aid sector allocate less money for invention compared with later stages. For example, the HIF allocates £25,000 for recognition and early-stage invention projects compared with £150,000 for development and implementation projects. DFID—the US Agency for International Development (USAID)’s Development Innovation Ventures (DIV) offers \$100,000 for invention, \$1 million for development of proof of concept and \$10 million for scaling. While this is of course better than no resources, it is clear that in many sectors, such as health or WASH, there may be as much need for upfront investment in the invention of new solutions as there is for subsequent testing and scaling.

The reality is that invention processes may be as expensive as, and, in some cases, even more expensive than, implementation, especially if the solutions generated are to be genuinely radical in nature and scope.<sup>20</sup> The WASH window of the HIF and the Oxfam GB Innovation Fund were both constructed in such a way as to provide some of the necessary resources for the invention stage. In both of these programmes, resources were made available to bring new actors together at early stages of innovation processes, to generate fresh thinking and identify new potential solutions to existing problems.

<sup>20</sup> This will depend on the nature of the project, the degree of capital intensity, the costs required for infrastructural change, etc.

It also seems likely that resources for selection, invention and development are not evenly allocated across different potential areas where invention of new solutions is needed. There is an observable tendency for such resources as are available to concentrate on particular issues and/or emergencies – for example diseases in Haiti and West Africa, shelter and digital mapping in Haiti, refugee communications and camp management in Syria and so on.

Where there is consistent funding for the selection, invention and development stages, it tends to be because particular organisations have raised funds and invested in their own innovation capabilities. This may be because of successful public fundraising – such as MSF with health – or sustained relationships with private foundations or businesses – such as Oxfam GB’s water and sanitation innovation fund, which has been supported by the Mariposa Foundation of New York;<sup>21</sup> the International Committee of the Red Cross (ICRC)’s innovation pilots, supported by Foundation Lombard Odier;<sup>22</sup> and UNHCR’s work with IKEA Foundation. There is a risk here, however: such financing tends to follow donor interests, and as such is based on specific kinds of solutions rather than responding creatively to innovation opportunities and needs.

In terms of depth, there is no continuous system of financing that allows would-be innovators to see a path from idea to invention to development and scale. The structure of available finance can in some cases work to filter and limit kinds of innovations through the invention and development stages. For example, with relatively small funds, there may be a dominance of process and diagnostic innovations that do not require large upfront investments to generate original ideas, and a relative lack of innovations that are about new products or that combine product and process elements. In cash, historical barriers to development were significant precisely because resources for innovation were concentrated largely around incremental improvements to food aid, which effectively filtered out cash-based improvements and others that sat outside the existing frame of the food sector.

There are not many examples of investment in the skills, capacities and infrastructure needed for invention and development in the sector. This is being addressed by some external actors: in

shelter, for example, there are a growing number of university programmes as well as selected corporate skills development ventures among engineering or architectural firms. But little of this shelter-based knowledge has as yet filtered into humanitarian operations. More positive examples are to be found in health, where the explosion of funding in recent years has led to extensive R&D efforts conducted by actors outside the sector, some of which has proved to be of positive value for humanitarian operational innovations. However, at the present time, the utilisation of such efforts and external resources is the result not of an active and strategic process but more of a slow and gradual ‘trickle-down’.

●  
**Rating: Amber**

#### 4.2 Are routines appropriate?

A wide variety of different techniques and routines can be employed to help generate new ideas and guide them forward from the stage of conception. These include facilitated, creative processes such as *design thinking* and more structured mechanisms for technical invention. Similarly, taking an idea towards the stage of workable protocols and business plans that will guide implementation can involve processes such as prototyping, systems thinking and so on.

On the few occasions that humanitarian innovation efforts have used such processes, they are seldom focused on humanitarian operations directly. Instead, many invention processes are initiated and undertaken some way from the front-line of operations. There is a necessity in doing this of course: contextual factors may limit the scope for systematic (as opposed to ad hoc) learning and experimentation. But, without some form of feedback loop to bring such ideas back to the practical realities of the ‘humanitarian front-line’, many processes end up generating ideas that do not *‘survive the encounter with reality’*.

At the development stages, inventions are often framed and communicated in ways that are consistent with existing humanitarian project and programme management approaches. This was referred to in WASH as *‘the low-hanging fruit mentality’*, whereby innovators find it easier to attract necessary resources by not straying too far from existing conventions. While this makes pragmatic sense, existing dominant designs do not permit the flexibility and adaptive

21 <http://mariposafoundation.org/docs/MariposaOxfamInnovation.pdf>

22 <http://blogs.icrc.org/gphi2/wp-content/uploads/sites/96/2014/12/Innov-brochure.pdf>

decision-making that are the hallmark of effective innovation management. Nor are dominant designs especially conducive to new thinking and approaches to critical issues such as risk management. Both of these issues are perhaps most obvious in the cash versus food debate. Initially, cash prototyping efforts did not challenge the dominant design of food aid because they happened at the margins of the sector, in a bottom-up and below-the-radar fashion.

Some of this work echoed the way in which selection, invention and development happens in the wider world of innovation management: there were prototypes, or minimum viable products, which served as *'learning probes'*; there were various *'pivots'*, or adjustments in response to feedback and context; and there was a principle of *'fast failure'* to enable learning and support redesign. Such failure is also referred to as *'intelligent failure'*, which includes a careful and controlled process of experimentation and learning. What was missing was a platform for sharing learning across these early stage experiments – although, as will be seen, this was put in place when cash started to be implemented and tested at scale. Over time, these early stage experimental routines became assimilated into the mainstream of the sector. They have even started to displace the incumbent dominant designs.

Various routines and mechanisms for recognising interesting inventions that exist in the wider world can have a bearing on the sector. For example, a much-critiqued shelter approach called the *'concrete canvas'* was the recipient of a World Changing Idea Award by Saatchi and Saatchi, which gave it a great deal of attention in the sector. This can be seen as a kind of externalised selection, which in this case did not lead to a very successful innovation process.



**Rating: Red**

#### 4.3 Are all roles understood and being played?

In many humanitarian innovation processes, invention and development efforts are seen as the focus of actors who work to generate ideas and then convert them into viable operational protocols and business plans. These actors may be the specific organisations that were the source of the original idea, collaborations made up of multiple organisations or third parties tasked to do the work by a commissioning organisation or network.

The roles required vary considerably by innovation type, but usually invention and development requires some combination of:

- operational experience;
- technical expertise;
- marketing and communication skills;
- finance and project management;
- innovation process expertise; and
- innovation leadership and entrepreneurship.

However, in practice, not all of these roles will be fulfilled for every innovation process, so many have to make do with what is available. There are particular recurring gaps in innovation process expertise, and around individual and group entrepreneurs who lead and drive invention, selection and development process. The need for such roles to structure invention processes, generate vision, inspire others, take risks and protect the effort is clear. However, there is a methodological and leadership deficit in the sector as a whole. This can leave selection, invention and development lacking rigorous and imaginative processes and without serious champions.

There are some examples of implicit financing to support such activities – such as the grants given to different organisations to build their internal capacities, including innovation skills. Good examples include DFID's on-going support to WFP, which includes funds for innovation purposes,<sup>23</sup> and the European Commission Humanitarian Aid and Civil Protection Department (ECHO)'s humanitarian capacity-building programme, which has been used to support innovation processes in water and sanitation. Where these resources are flexible enough, it enables more progressive-thinking organisations to support innovation management pilots or specific departments.

Across all of the sectors, there is an issue of the roles external actors play in invention processes. In shelter, established players in the humanitarian sector are more likely to give prominence to incremental innovations, whereas the wider network of scientists, professionals and industry players may come up with more radical ideas and solutions. The sector has a tendency not to fully engage with these actors

<sup>23</sup> <http://www.alnap.org/resource/5759.aspx>

in innovation processes, citing their historical lack of relevance for operational responses. At the same time, key humanitarian actors can be scathing about the ideas that do emerge into the mainstream. This is both contradictory and counterproductive, and means existing skills, capacities and enthusiasm for invention are not fully utilised.

This is not to say all external actors are ready and willing to play an active and full role in invention. For example, in both shelter and WASH, academia has been seen as overly focused on its own research questions and less willing to move towards applied research on the issues of concern to the sector. The potential for scientists and researchers to be ‘critical friends’ in the innovation process is on this basis rather limited. However, there are some important exceptions to this. MSF’s operational research teams regularly collaborate with teams of scientists and academics, providing both operational platforms for the testing of new external ideas and generating external critical inputs into its own home-grown ideas.

By contrast, there are few examples of such sustained operational innovation partnerships with the private sector, with decision-making issues, fitful engagement and different cultures and ways of doing business cited as reasons. This frustration has led a number of private sector entities to work in parallel with the formal sector, developing and testing their own innovations directly. Where private sector organisations do work with the humanitarian sector, it tends to be on the basis of incremental innovations, such as the IKEA flat-pack tent or WFP’s logistics improvement partnerships with TNT.

In general, it seems fair to say that actors outside the sector do not get the signals or opportunities they need to play an active role in invention and development, especially of a more radical form. In shelter, this has traditionally been especially true for those affected by crises, who ‘are the first responders during an emergency and the most critical partners in reconstruction’.<sup>24</sup> However, this may be gradually changing. In the wake of Haiti and failures there, there are now increasing numbers of humanitarian actors who are inventing and testing new ‘facilitation-focused’ approaches to shelter.

●  
**Rating: Amber**

#### 4.4 Are relationships in place and functioning?

Across the select, invent and develop functions, there is generally a positive emphasis on collaborative processes of dialogue and collective learning to develop solutions to humanitarian challenges.

At this stage of innovation management, there are three distinct ways that innovation management processes might be articulated:

- 1) an internally focused approach that assumes the necessary capacities are available in-house or can be bought in;
- 2) an approach that is more contractual in nature, involving third parties (e.g. consultants, universities) being tasked to undertake invention and development;
- 3) an approach for the invention process to be highly networked and collaborative by design. Here, there is a great deal of potential to engage better, both across the sector and with the outer circle of industry, science, professional bodies, national and local actors and end-users.

Across the case studies, there are more examples of the first two approaches to relationships in this stage than the third. While this is understandable, given the capacities in the sector, risks need to be navigated in each of the three approaches. With the first approach, there is a chance that ‘going it alone’ can lead to an institutionally narrow approach and innovation processes that are overtly shaped by dynamics of the sector.

In general, innovations succeed in the humanitarian sector when they set aside narrow institutional interests for a broader sector-wide agenda. With the second approach, the risk is that invention and development becomes overtly contractual in nature, and does not permit the creative and open thinking that is needed at this stage of the innovation management process.

Finally, for a more networked approach, issues of trust- and relationship-building often need to be addressed. Without confronting these issues, such efforts end up not being as collaborative as might appear from the outside. Instead of genuine multi-stakeholder networks, actors work together in a rather mechanical and insular fashion. Instead of true collaborative dialogue, there is a series of bilateral technical inputs into time-bound processes managed by humanitarian agencies.

This means, for example, that, if humanitarian actors do not provide clear specifications or requirements, it becomes very hard for external actors to meet their needs adequately. This is especially true for engagement with the private sector. In shelter, many practitioners feel the private sector should be supporting reflection, learning and new approaches towards transitional shelter and settlements. However, private sector operators frequently complain that, although the humanitarian sector wants support, what form of support is needed is very unclear. Meanwhile, humanitarians feel current private sector involvement commonly focuses on physical solutions to shelter needs, and tends only to engage where there is potential for considerable scale (and therefore profit). This has resulted in inappropriate provision of solutions and products, and some wariness in the humanitarian community towards private sector engagement.

There is also an obvious fracture-point with local and national actors, who have long been excluded from humanitarian responses. This has largely been replicated in humanitarian innovation efforts. This runs counter to the growing realisation that local involvement is not just a values-based ideal, but also – as is understood in the wider innovation management literature – adds practical value and acceptance and can greatly enhance product development.

●  
**Rating: Amber**

#### 4.5 Are the rules supportive or restrictive of the operation of the ecosystem?

Unlike the processes of search and discovery, the select, invent and develop stages are shaped by a wide variety of standards and protocols. These can work to limit what is acceptable and can legitimate invention processes. They may also serve as a driver of innovation in some cases.

For example, a variety of performance standards and metrics – although not universally accepted in the sector – shape people’s expectations of what is possible in humanitarian responses. For example, the SPHERE standards set out minimum requirements for each of the largest sectors of aid delivery, specifying in numerical terms a variety of indicators, ranging from minimum nutritional and clean water requirements per person through to standards for shelter construction. New invention processes can use these to set out formally how the idea will improve humanitarian delivery – for example a new mechanism for addressing food security may enhance the nutritional output of aid for a given output. By contrast, there may be ethical standards that serve to limit what can and cannot be done. In the wake of the Ebola crisis, there were numerous calls by Western disease specialists to use experimental and untested drugs on West African populations. This saw considerable push-back by aid agencies, which argued that, even in the absence of a cure, it was not ethical to experiment on poor and vulnerable populations.

Staying with disease response, the provision of emergency medicine has associated standards of care and a variety of clinical protocols to ensure interventions follow good practice and available evidence. Therefore, any new idea needs to be reviewed from the perspective of both operational relevance and clinical feasibility. Although this should not be seen as duplicable across all other sectors, it does provide a useful benchmark for how evidence can support and strengthen innovation efforts.

As with the processes of search and discovery, informal rules (professional norms, organisational expectations and so on) may serve to limit the scope of invention processes. For example, since humanitarian support serves people who are at their most vulnerable, there is an implicit risk assessment that results in a willingness to support ideas that are more known and less disruptive. Consequently, it is more likely ideas that are only incremental improvements on existing ‘dominant designs’ in the sector will be favoured.

●  
**Rating: Red**

#### 4.6 Are good, credible results being generated to support effective decision-making about innovation management processes?

Typically, for an innovation to move through the invention and development stages requires the generation of plausible evidence against some hypotheses of its added-value. Ideally, this would be based on an objective assessment of the idea, both in terms of whether it worked as expected (viability) and against a range of feasibility indicators that show it can also be usefully and practically deployed in humanitarian operations. The latter might include measures such as cost-effective, efficiency, effectiveness, possible reach and so on.

Humanitarian innovations that move through the invention and development stage towards implementation are not always subjected to such evidence-based processes, and therefore not all are anchored in solid and objective results.

There are exceptions by sub-sector, especially in health and infectious diseases, and to a lesser extent in WASH. There have also been many evaluations of particular kinds of innovations, such as cash-based approaches.

In general, however, instead of objective evidence, innovations move forward into implementation on the basis of one or more of the following:

- common sense appeal (*'It obviously works'*);
- anecdotes (*'It worked somewhere else'*);
- pragmatism (*'We should do this because it could well be an improvement on what we already do'*); and
- institutional interests (*'Everyone else has one, we should be implementing this so we have one too'*).

This unevenness may in part be because there are not many generally accepted means for generating evidence and using it to validate invention and development processes.

There are also challenges around what might be effective test or laboratory conditions in which new inventions can be assessed. In some settings, like health, there are often early-stage trials in settings that provide partial parallels to emergency contexts, and findings from such trials can be published in a variety of journals. Where such test sites and means of dissemination of results are not available, the conditions are theoretical projections or simulations of what might be, and may be undertaken by a relatively small group of actors and not publicised. Therefore, objective results may not be forthcoming until the subsequent stage of the innovation process (i.e. implementation and testing).

One way around this, as employed by the shelter sector, is the use of consultative meetings and workshops to gauge sector-wide perspectives on emerging and new approaches. Another is to undertake, as with UNHCR's Refugee Housing Unit, demonstration trials of new products, with humanitarian actors providing objective feedback on their potential viability.

In general, lack of results in the invention and development stages can have serious implications downstream, as it is at this stage that the innovation gets defined and success metrics start to get developed. If this stage is not sufficiently sound in terms of hypotheses and results, it can lead to poorly designed pilots and inadequate performance of the innovation in question, even if the underlying ideas and principles are sound.

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**Rating: Red**

#### **Summary of selection, invention and development**

Figure 3 shows graphically the results of our analysis of the selection, invention and development phase, the innovation ecosystem works marginally better than it does in search and discovery. There is additional resourcing, although this is not sufficient to trigger a high quantity of high-quality invention processes. While routines are rather weak, the roles and relationships are clearer; rules can be a driver but are more likely to inhibit innovation processes. Still weak is the focus on results, with little in the way of performance assessments, prototype evaluations or early-stage trials being undertaken to enable ideas to move forward on an objective footing.

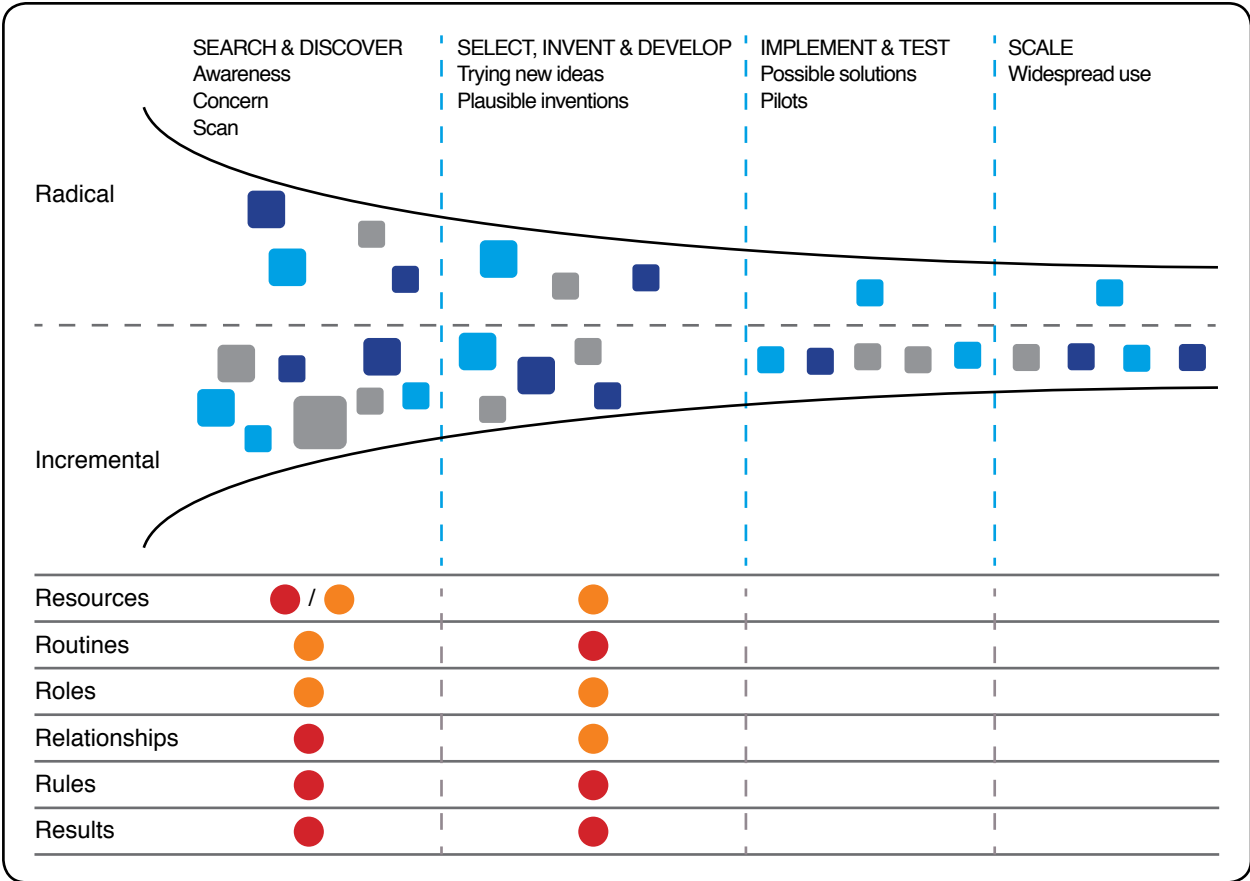


Figure 3: Innovation ecosystems – selection, invention and development

## 5 Implementation and Testing

This stage describes plausible solutions trialled in real-world settings through pilot processes that are systematically analysed, with the results used to move forward into scale, or to trigger subsequent adjustments and iterations of development before further testing.

An effectively functioning innovation ecosystem would have the following features:

- defined funding streams and appropriate funding mechanisms to support and facilitate implement and testing search;
- detailed project plans and review approaches to manage progress along the steps from concept definition, prototyping, piloting, test marketing, launch, etc.;
- where required (e.g. radical innovations) support for extensive trial and error, fast failure, learning and experimentation, agile developing and pivoting;
- support for agile development across a learning community of engaged stakeholders (including lead users); and
- establishment of effective norms for performance and operation.

### 5.1 Are there sufficient resources?

There are a number of regular and routine sources of financing for the implementation and testing phase. These include specific standing grants mechanisms (HIF, DIV Humanitarian), as well as a range of one-off investments by donors and private sector foundations such as the Bill & Melinda Gates Foundation and IKEA Foundation in specific organisations or technologies. Some organisations also have their own innovation funds specifically for ideas generated within the organisation – some of these, funds such as WFP, may be paid for by donors; others may draw resources from a variety of private sector partners. These resources have been positive in that they have provided much-needed investments in processes that might otherwise not have been supported. They have enabled the organisations and consortia in question to learn more about managing innovation processes and, in a number of cases, have led to positive results.

In this stage, the resource availability, while reasonably positive thanks to investments in mechanisms such as the HIF, reveals a lack of ‘joined-up’ financing enabling innovations to move ‘end-to-end’ from search to implementation and scaling. In the implementation and testing stage specifically, particular challenges exist because funding may not be available for the multiple rounds of adaptation and iteration that are typically needed in successful innovation processes.

Where innovation processes have been successful, it is usually because of multiple trials in multiple sites and the aggregation of evidence. Resources that enable such piloting and testing unfortunately are the exception and not the norm. Where this happens, it is generally because of the pooling of multiple resources from donors, implementing organisations and external partners. Where such an approach is not possible, it can contribute to frustrations for innovators, and sector-specific ‘valleys of death’ for ideas that have failed to make the transition from early implementation to subsequent scaling.

It is also worth noting on this point that resources appear to be more readily available for designing and implementing pilots, with less investment of funds in evaluating the results of pilots. Without investment in the latter it becomes hard – if not impossible – to say whether a pilot has been successful or not, and whether it is worthy of scale-up. However, with scarce resources for innovation, it is perhaps understandable that the balance of effort has tilted in this way. The challenge now is about ensuring additional funds to support and enable more evidence-based pilot processes.

● **Rating: Amber**

### 5.2 Are routines appropriate?

The process of developing and implementing innovation pilots often mimics the development and implementation of humanitarian programmes. To the extent that innovations should be subject to similar pressures and constraints as a ‘live’ humanitarian project, this is a good thing.

But it also means the routines for developing and implementing pilots are steeped in, and subject to, the vagaries of humanitarian project management.



These issues include a range of factors that can be antithetical to innovation – for example an expectation of *ex-ante* knowledge of what will work, very low risk tolerance and a weak focus on evidence and evaluation.

What this means in practice is the routines for pilots are not especially attuned to the needs of innovation management. Specifically, there is little support for pilots to use principles of rapid prototyping and agile project management that have been successful in the commercial world. Instead of cycles of *'build-measure-learn-rebuild'*, the focus of many humanitarian innovation pilot routines is a more linear *'build-assess-stop'*. The cash case showed this is not inevitable, however. The implementation and trialling of cash was a case of learning and adaptation, with no real master plan. Many of the experiments varied from each other, as did technologies and partnerships. The pattern was one of small-scale entrepreneurial activity that allowed the defining and refining of a genuinely new model for assistance. This was facilitated by the fact that the trials took place at a time of rapid technological change when new developments (such as mobile payments and better online security) were enabling the parallel development of the 'carrying infrastructure' for cash programming.

Where the innovations are process-focused, and especially when they are distant from operational concerns, there is a tendency not to use project management protocols at all, but instead to frame the innovation along the same lines as organisational change initiatives instead of innovation management principles. This can lead to lack of clarity on the actual humanitarian contribution of the pilot in question, with few if any verifiable indicators of success.

As with invention and development, there are no well-established mechanisms for ensuring pilots undergo systematic testing and validation. Where these are used in innovation processes, they might draw from methods for humanitarian evaluation more generally, using criteria such as relevance, appropriateness, efficiency and effectiveness. Or they might be based on sector-specific frameworks and indicators. But all too often, the routines for testing, when they are in place, do not draw comparative analysis or benchmarks against existing approaches. The rationale often given for this gap is that there are no metrics for existing performance levels – and the data are simply lacking in most sub-sectors and most examples. In the extreme, this means many pilots

are neither successful nor killed but dwell in a kind of innovation limbo, where they can be taken forward if specific actors feel strongly about them and few others can put up counter-arguments.

In WASH, the issue was seen as one of not being clear about whether the investment in trials and tests would be worthwhile: there needs to be a good initial case, and the data and evidence are not always available. Depending on the type of innovation and the capabilities of the organisation in question, this may then require bringing in external expertise from universities, research centres and private sector testing facilities.

Where this process works in a relatively effective way is the health/disease response sector, where there are typically good data sources on existing performance, verified by multiple sources and approved by WHO, and where any alternative needs to go through the same process of validation and vetting. There are two specific examples – of *seasonal malaria chemo-prevention* and *short-interval additional dose* approaches in polio responses – where the innovative approaches in question had already been applied in a number of settings without extensive evidence for their efficacy. Here, the innovation management processes were focused on effective testing, and were constructed so as to subject the two techniques to proper evidence-based validation and evaluative processes. In both cases, the application of evaluative processes demonstrated that the methods were effective and highlighted the costs and benefits. This led to their endorsement by WHO and wider application.



#### Rating: Amber

### 5.3 Are all roles understood and being played?

The critical roles in pilots of humanitarian innovations are two-fold. First, organisations take the lead in constructing, managing and delivering the pilot, and often work with other pilot partners who contribute capacities such as resources and partners or organise sites for implementation. Second, experts and other technical specialists work together in steering groups to shape and manage the process.

The teams for innovation piloting are not always set up with an appreciation of what is needed for different kinds of innovations. In general, there is a

need for cross-functional teams, including operations, research, marketing, technical expertise and so on. All too often, pilots have cross-functional steering groups but not cross-functional teams. This may, of course, be because of not a lack of understanding but rather limited capacity to fill the relevant roles.

The critical gaps in pilot-specific roles include:

- field staff, who might play an active role but can equally be left out by pilots that run in parallel to the day-to-day operations;
- communities affected by disasters, which (if involved at all in pilots) are usually seen as a distant beneficiary of the innovation process;
- lack of an explicit innovation management role in pilots; and
- lack of active or central involvement of the private sector in pilot processes.

What this means is that the user-driven potential of innovation processes is heavily constrained. It also means limits on the diversity of approaches to the pilot and on mid-pilot course corrections to those that emerge from the humanitarian operational organisation.

There are some positive examples of roles within pilots, specifically around engagement with researchers. This is slowly improving: it is rare to see a humanitarian pilot without some form of research function. However, this role is not always distributed across the whole of the pilot cycle; researchers tend to be involved in design and implementation and rather less so in evaluation.

In shelter, there are a number of examples of partnerships with commercial manufacturers – in particular for tents, plastic sheeting and shelter kits. However, at present, these partnerships tend to be product-focused, for both commercial and profile reasons. There are also some interesting uses of social enterprise business models, through both partnership with external actors and developing such mechanisms in-house. These efforts tend to be more focused on process and ‘facilitating shelter processes’ rather than ‘delivering shelter solutions’.

●  
**Rating: Amber**

#### 5.4 Are relationships in place and functioning?

The relationships needed for pilots to work tend to be based not on formal structures and mechanisms but rather on informal social interactions. This is not dissimilar to what works for projects, regardless of the setting or focus. But within the humanitarian innovation space, reliance on existing social networks can mean pilots are rather insular and sector-specific and do not leverage outsider knowledge sufficiently well. This may lead to situations of group-think within some pilots, whereby the accepted wisdom is not questioned.

The ideal is to see the pilots as a series of concentric circles of relationships, with the pilot team at the centre, supported by a wider network of advisors and experts, and finally with a strategic group helping shape and steer the process. Where the relationships work well, there is clarity on these different kinds of actors and openness to accepting new ideas from across the whole of the pilot’s network of actors.

For example, the UNHCR partnership with IKEA Foundation and a Swedish engineering and design company to develop the Refugee Housing Unit is currently being put through an operational trial in Ethiopia. The *action learning* approach the collaborators took was seen as essential to achieving the best outcomes and also to identifying the best partnership model for testing and improving the innovation.

Where there is such a good, diverse network of relationships supporting a pilot, it is usually because of concerted efforts to set up and manage these interactions. Specifically, the principles of communities of practice and learning partnerships are actively employed and, when successful, can lead to tremendous benefits for the success or otherwise of the pilot process. These can often use a mixture of communication tools, from virtual networks to email lists, web-based forums and social media.

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**Rating: Amber**

#### 5.5 Are the rules supportive or restrictive of the operation of the ecosystem?

The rules and conditions informing the design of pilots are not dissimilar from those shaping the sector as a whole. The range of accountability and ethical guidelines, discussed earlier, do play a role. Because

of the amounts of money involved, there are often fiduciary requirements that need to be fulfilled, and the sector is not known for its flexibility in this regard.

As a result, many pilots are seen as constrained by rules that serve to restrict innovation and creativity. It may be that this is overstated: after all, innovation always faces constraints of different kinds. However, the weight of rules and regulations can mean that, in addition to operational and contextual constraints, humanitarian innovations face procedural constraints that limit flexibility and the autonomy of decision-making. For example, in the Haiti response, the wealth of social media tools and techniques were shown to be highly accurate in anticipating critical problems, such as the outbreak of cholera and its early progress. The tools were also cost-effective and fast and gave greater detail on population dynamics. However, aid agencies were unwilling or unable to adapt and use these tools, relying instead on official reports, which took up to two weeks longer and were often less accurate, out-of-date and therefore unusable in operational decision-making. As a result of the lack of routines for real-time trialling of these tools, the cholera response was slower and less effective than it might have been.<sup>26</sup>



#### Rating: Red

### 5.6: Are good, credible results being generated to support effective decision-making about innovation management processes?

There is a sector-wide expectation, seldom met, that pilots should have solid and validated results if the innovation in question is to be taken seriously. However, the lack of resources alluded to earlier means many pilots are not formally evaluated, so many results are anecdotal in nature – or at best tend to be based on self-assessments rather than objective analysis.

The lack of sustained or routine resources for formal evaluations and assessments is a major weakness for the sector as a whole. There are exceptions, as noted previously, in the disease field but also elsewhere. In WASH, there has been a drive to build evidence in a systematic fashion. At a very simple level, this means investing in collecting and synthesising operational and monitoring data about the suitability or effectiveness of a given product or process. Oxfam

GB has been using this approach to analyse the costs of solar-powered water pumps, which it is using in discussions with potential donors about running costs relative to traditional solutions.

The shelter case study also identified positive examples of results being used to both promote and critique innovations. The transitional shelter approach saw its largest deployment after the Indian Ocean tsunami of 2004, with a number of learning assessments undertaken in Sri Lanka and Aceh finding the process was a useful one with transformative implications. The deployment in Haiti, however, was another watershed, one that strongly challenged the value and applicability of the approach in urban settings. As a result, the approach is not now seen as the transformative solution it once was.

Also in shelter, there are some interesting examples of how results have illustrated the benefits of more incremental innovations. Through the development and testing of standardised shelter kits, pre-positioned regionally in significant quantities using defined and tested specifications, IFRC found it was possible to enhance the speed of delivery and the predictability of the response. DFID and other agencies have since replicated the model, illustrating a successful incremental improvement to an existing and widely used product.

In cash, evidence made a critical contribution: many trials of cash were extensively researched, monitored and evaluated, and findings and their effective dissemination across the sector were instrumental in the subsequent scaling-up of cash-based approaches. Interestingly, the role of evidence changed as the trials progressed: at first, the focus was on feasibility and appropriateness, in order to overcome scepticism from the mainstream food sector. Over time, it shifted to generating evidence of cash specifically as a viable alternative to mainstream delivery, and focused on questions of scale, infrastructure and security.

Relationships with academia and scientists are of obvious importance for generating pilot results, and tend to be rather mixed. In WASH, there are often comments from operational agencies that academics have ‘unrealistic standards’ of evidence that cannot possibly be met in emergency settings. This may come down to different interpretations of what is meant by results and research, with implementing organisations more satisfied with anecdotal evidence

<sup>26</sup> There is currently work underway to develop working principles of humanitarian innovation; if these are able to articulate practical aspects of principles, such as common protocols for pilots, it may well be that they constitute a set of constructive rules for pilots. The work is being led by the Humanitarian Innovation Project at Oxford University together with UNHCR and is a contribution to the work of the World Humanitarian Summit’s Innovation Thematic Group.

and ‘wanting the answer’ and researchers seen as ‘looking for magic bullets that don’t exist’. This relationship tends to work best where the academic organisation in question has a long history and experience of working in crisis settings, or where the operational organisation invests in in-house research capabilities, both of which can have a positive impact on evidence quality.

Would-be innovators raise a more general point here, about expectations of results from pilots. There are numerous complaints that the evidence standards for new approaches are often higher than those being met by existing processes. To put the boot on the other foot, if the level of scrutiny of new approaches were extended to existing approaches, this might serve to highlight in a much more objective fashion the need and potential for new approaches.

**Rating: Amber**

**5.7 Summary of implementation and testing**

Figure 4 shows graphically the results of our analysis of the implementation and testing phase. As with *selection, invention and development* this stage sees rather better performance from the ecosystem. The growth in financing for innovation, although not commensurate with needs, is positive and is a step in the right direction. Much of this is focused on implementation and testing new ideas, and there is growing realisation of the need for effective protocols for such tests, for effective relationships between multiple actors and for good results. Here, however, the rules tend to restrict rather than facilitate new solutions being implemented, especially in operational contexts where there is an inherent conservatism about what can be trialled.

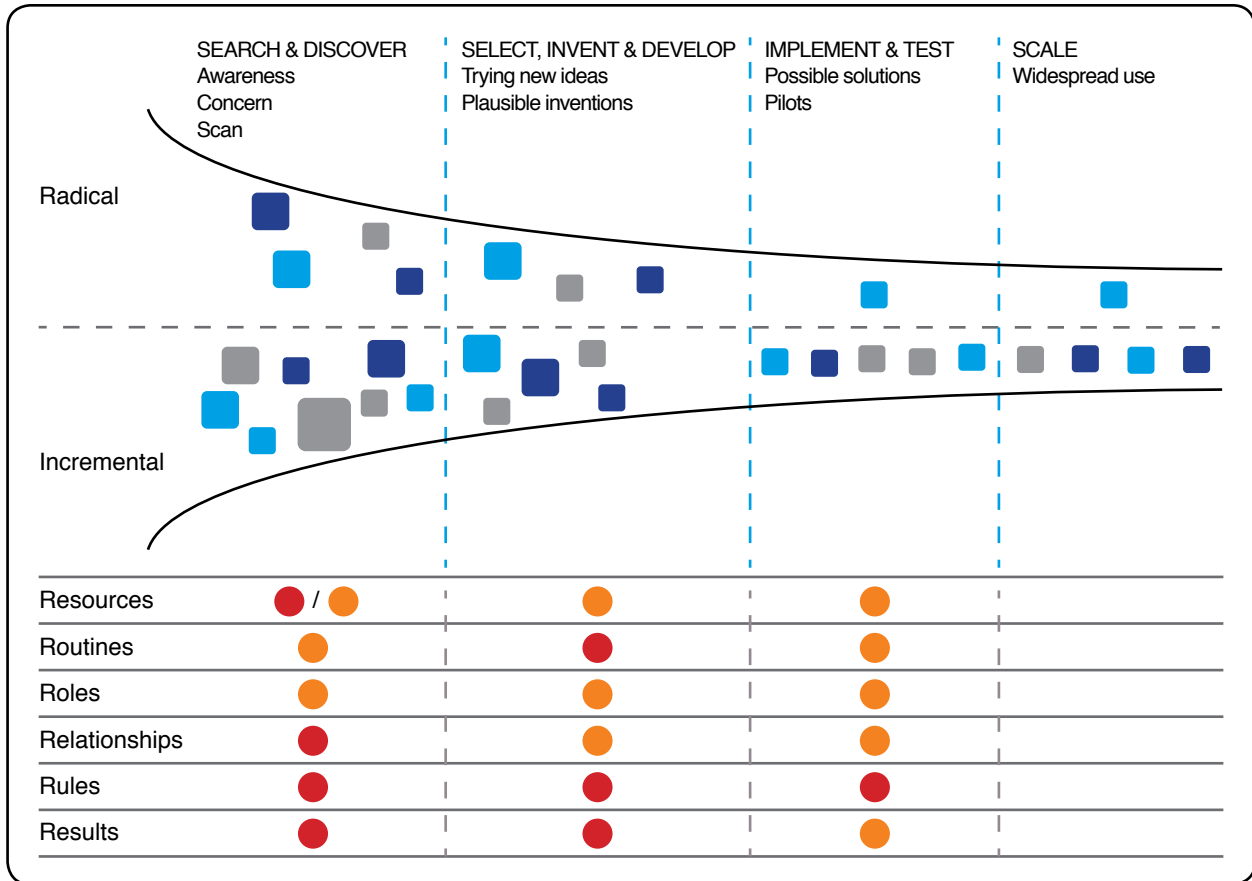


Figure 4: Innovation ecosystems – implementation and testing

## 6 Scaling

In this stage, we see innovative solutions moving to widespread use through a variety of mechanisms including open-source dissemination, replication, incorporation into government structures and commercialisation.

An effectively functioning innovation ecosystem would have the following features:

- funding platforms and mechanisms specifically designed for the diffusion of new and tested approaches;
- investment in competencies and infrastructure to support successful scaling processes;
- identifying and working with early adopters and use of their insights to shape and configure the diffusion process and good networks with other relevant partners;
- demonstration projects, dissemination of pilot results and other approaches to assessing and communicating value in order to increase adoption; and
- space and scope for ‘creative destruction’ of existing and established practices;
- systematic assessment of added-value relative to existing protocols and operating procedures.

### 6.1 Are there sufficient resources?

The issue of resources for scale is raised frequently across the humanitarian sector. While some financial resources have been made available for the purpose of scaling approaches, such as the USAID–DFID DIV Humanitarian window, these have not been utilised to any great extent, in large part because of the quality of the proposals received to date.

Across the four sub-sector case studies, there seemed to be a rather narrow conception of how innovations should go to scale in the sector. In many cases, it seemed to be the assumption that scaling successfully implemented and tested innovations requires additional ring-fenced resources. However, this was true only for innovations that were truly new and filling a need previously not addressed. In many

other cases, the resource requirements are different. For example, there are innovations that are directly comparable with, and have been proved to be more effective than, existing approaches. Here, scaling resources should arguably be through a reallocation of operational response budgets towards the new approach. It is only through such reallocations that new ideas will see genuine and sustainable diffusion into the delivery of aid. The cash case study illustrates this very well: the resources available to the sector during the Indian Ocean tsunami response created both an opportunity – and, arguably, a need – for the sector to experiment with cash distributions. This was a vital stage in the maturing of cash from a series of small-scale experiments into a more mainstream programming approach. Although working at a national rather than a global level, the scaling of the Surveillance in Post-Extreme Emergencies and Disasters (SPEED) mobile disease monitoring system was similar: the initial development was paid for by a network of donors, but its deployment in response to Typhoon Haiyan was paid for through core humanitarian funds via the consolidated appeals process.

The key point is that, for some innovations, dedicated or earmarked funding for scaling may create more problems than it solves. It can result in the innovative effort being undertaken as a parallel activity to core activities, and can also limit the uptake of innovations to the availability and sustainability of such funds.

That said, there is a need for resources for scaling. This may include support for further, more extensive trials, for communications and advocacy work and for provision of knowledge products and learning processes around the innovation. There are some cases, such as the rapid TB test looked at in the health case study, where there was a requirement for *both* lump-sum investments by government donors and the UNITAID fund to subsidise the price of the test (through over \$35 million in funding), and operational budgets of NGOs to pay for the lower-price test kits. And there are some examples, in WASH, of switching costs being identified as a major impediment to starting the process of scale. Without some investment, existing interventions will continue to be used even if the alternatives are potentially more effective.

Overall, there is little appreciation across humanitarian actors as a whole of the range of resourcing mechanisms that might be needed at different stages of the innovation management process. This is manifested with a blunt instrument attitude towards scaling efforts, on both the supply and the demand side, which is seldom suitable. This highlights the need for better learning and assessment around different funding and resource vehicles that could be used, and more experimentation with approaches that might be used outside of the sector, even if they are at odds with current financing approaches.



### Rating: Amber

#### 6.2 Are routines appropriate?

Across the sector, there was some evidence of routines that enabled scale. These tended to be sector-specific, for example WHO approval of specific new approaches, WFP validation of cash-based approaches and so on. In WASH, there are some novel ways of bringing scalable innovations to the attention of potential users: trade fairs, cross-agency forums, marketing and product demonstrations.

Beyond approvals and communications, there is a need to accept that scaling is not just a technical routine but also a political, institutional and entrepreneurial one. These capacities can be brought together in the form of strategic communication campaigns around the benefits of the new approach. Such communication processes help join the dots between implementation, testing and mainstreaming innovations into operations.

There is often a very narrow view of scaling processes within the sector. For a given innovation process, scaling can mean a variety of different things, including:

- replication of innovation by implementing organisations — for example community-based feeding therapy;
- open source dissemination of a given approach through a variety of adaptations and adjustments, for example cash;
- incorporation into government policy and structures, for example the SPEED mechanism for disease surveillance and DFID's high-level panel on cash-based transfers; and

- successful commercialisation and the creation of well-functioning markets, for example the rapid TB test.

Across the sector, different actors use scale to mean these different things, and there is little acknowledgement of this diversity of meanings. This can create serious barriers to understanding, let alone effective innovation management.

For example, the widespread assumption among humanitarians is that scale is about the sector itself replicating innovations. However, the private sector, and increasingly some donors, understand scale as commercialisation. This can lead to issues and controversies around specific innovations. In some cases, these differences can spill over into major legal and ethical tussles.

Perhaps the most notable example is the use of community-based feeding therapy, which was the subject of a patent by Nutriset, leading to legal action against other developers of peanut-based malnutrition treatments. Eventually, after advocacy and public denouncement of Nutriset by NGOs as a *'humanitarian profiteer'*, Nutriset capitulated and withdrew its legal threats.

More generally, however, humanitarians are not fully cognisant of how market mechanisms can be used in pursuit of humanitarian innovation, with little understanding of how they might go about creating effective markets or indeed of the markets they currently support. As a result, a sense of arbitrariness surrounds which innovations see successful commercialisation and which do not.

Even within replication, however, there is little sense that the humanitarian sector is especially effective at scaling routines. The lack of knowledge-sharing, the weakness of evidence and lack of a culture of sharing good practices all mean replication is far from straightforward. The barriers to adoption and diffusion still seem to outweigh the enablers.



### Rating: Amber

### 6.3 Are all roles understood and being played?

Across the humanitarian sector there is some tacit appreciation of the roles played in diffusion of innovation, with language such as *'champions'*, *'early adopters'*, *'laggards'* and so on in common use. This serves to give some indication of the state of ongoing diffusion processes. However, the examples looked at across the case studies indicate a distinct lack of a strategic approach to this stage of innovation management.

As noted earlier, for different innovations the *'end-game'* of scaling can be quite different, as are the necessary processes – and this can usefully be understood with reference to the actors involved. For example, cash has gone to scale through a process of open source dissemination, whereby different humanitarian actors have picked up the basic approach and adapted it for many different settings. The scaling of the SPEED early warning system happened because of uptake by the Philippines government, whereas the scaling of the rapid TB test was because of commercialisation and subsidies. Finally, the scaling of community feeding therapy was enabled by the replication of the core approach by implementing organisations.

This range of approaches to scale highlights that the right roles must be in place to make it possible to use the appropriate processes and approaches when an innovation reaches this stage. The reality is that the right relationships are seldom established by the time the scaling stage is reached. In particular, effective relations with private sector and governments are lacking in many humanitarian innovation processes. This creates humanitarian-specific *'valleys of death'* at the scaling stage.

The lack of routines for scaling is especially pronounced because of the fragmented and piecemeal nature of humanitarian work. This leads to a lack of the necessary organisational and operational continuity – even in settings such as protracted crises where the same organisations have been working on the same issue for considerable amounts of time – sometimes stretching into decades. The evaluation of the SPEED system in the Philippines argued that the reason it reached national scale was precisely *because* it was not left to humanitarians to continue its deployment between disasters. Instead the central

involvement of the Philippines government was vital for moving the mobile surveillance system from initial pilot, adaptations, subsequent deployment and eventually national coverage.

●  
**Rating: Red**

### 6.4 Are relationships in place and functioning?

Surprisingly, given what is understood about innovation in the sector, there is often an assumption that one organisation can play all the roles necessary for scale. The reality, of course, is that this is seldom the case.

Even scaling an innovation within a particular organisation needs to draw on external partners and parties, from donors to suppliers, in order to make the necessary changes. Most importantly, especially for operational innovations, is that aid recipients must be engaged and involved in the process.

These networks and relationships should have been built up over the course of a successful innovation management process, but they seldom are. Instead, the scaling stage can see a rather clumsy attempt to involve other actors, who often are less interested because they have not been fully engaged through the process.

●  
**Rating: Red**

### 6.5 Are the rules supportive or restrictive of the operation of the ecosystem?

There are a number of implicit rules governing scale, but these tend to be based on the idea of scaling as replication (as opposed to the other three end-games described earlier). This demands certain criteria and standards be met – broadly speaking that the approach is at least as good as what went before. In reality, the decision to scale tends to be based on whether the new approach is as easy to deliver as what went before, and whether it is as acceptable as what went before. In practical terms, this means anything that is not an incremental innovation requires further changes to the system for delivery. This places additional limits on scaling processes for radical ideas.

There is a lack of planned ‘creative destruction’ of old approaches. Even in situations where a new approach is approved, old approaches are never shelved, and this means that in many settings the old and new co-exist. In addition, in particular sectors, specific constraints and limitations to scale exist that have been in place historically and often need to be overcome. Examples might include the cap on the amount of aid that can be given as cash versus food.



### Rating: Red

#### 6.6 Are good, credible results being generated to support effective decision-making about innovation management processes?

Because of the aforementioned gap in results from pilots, and the lack of standards and approvals systems such as the WHO mechanism for every sector, it is often very hard to judge objectively when something should be scaled up or not.

There are exceptions, usually to be found in the health sector, where there are large-scale investments in trials and assessments to determine feasibility. This was found with the approaches to malaria prevention and the polio response, which, as discussed previously, were utilised in ad hoc ways in humanitarian health efforts before solid evidence was available and before WHO endorsed them. After the generation of evidence (through a systematic review for one and large-scale trials for the other), both were deployed in different settings – the malaria prevention mechanism across West and Central Africa and the polio management process in Somalia. In Somalia, use of the polio approach involved a major national campaign, with a team of national volunteers and health workers visiting every household in every settlement multiple times and vaccinating 1.8 million children under the age of five.<sup>27</sup>

WHO noted that the eradication of polio in Somalia was largely thanks to an innovative treatment protocol that enabled multiple vaccinations of infants without causing undue harm. While this generated useful operational evidence, the scientific basis was still not well established. The utilisation of multi-country trials eventually generated evidence that the approach worked. It was then rolled out in December 2013 to the countries surrounding Syria, and constituted the

largest ever vaccination programme in the Middle East, targeting 25 million children across seven countries.<sup>28</sup> At the time of finalising this report, Syria was declared polio-free.

These humanitarian health examples highlight that there is a need to draw on and triangulate multiple sources and forms of evidence for scale – a point also made in the WASH sub-sector.

Aside from these examples, which are rather more positive, there may be more problematic examples. For example, the range of mobile-based applications have had little in the way of objective evaluation but are still being used widely. Regarding scaling being resisted despite successful results, in WASH there are instances of highly visible innovations, whose benefits have been clearly demonstrated and criteria for selection clarified, that still do not see wider uptake. For example, the WASH cluster has its own standard set of equipment available for use by members, but the tendency of organisations to have their own specific products and services has limited its scalability. In other settings, it may not be the ‘not invented here’ syndrome but actual disagreement about which product to adopt.

This becomes especially problematic where there are examples of humanitarian approaches that have been widely used despite a lack of robust evidence that they work or those that are not being scaled despite available evidence.

For all of these reasons, there is a weak evidence base on the extent to which something *has* been scaled. There are some interesting examples where a firm focus on data has meant the application of a new approach has been systematically tracked, but these tend to be exceptional. Overall, it seems fair to say that the weak results culture of the sector as a whole tends to have a major effect on scaling efforts. The lack of a well-developed evidence base places limitations on decisions about diffusion and adoption. In some cases, this is because of the sheer number of innovations that are available: there are too many to evaluate properly. In practice, it is likely that those innovations with the best marketing will be scaled most effectively, even if they are not the most effective or functional.



### Rating: Amber

<sup>27</sup> <http://www.emro.who.int/polio/countires/somalia.html>

<sup>28</sup> WHO and UNICEF (2013) ‘Strategic Plan for Polio Outbreak Response’. Geneva and New York: WHO and UNICEF.



### 6.7: Summary of scaling

Figure 5 shows graphically the results of our analysis of the scaling phase. After a relatively positive story in terms of implementation and testing, the fractures in the innovation ecosystem are much more evident in the scaling stage. Resources are again available, but are not always considered strategically. There are some instances of effective routines for scaling, but relationships and roles are seldom in place or effective. Again, rules represent a major blockage for the innovation process, but there is a greater emphasis on results as a yardstick for successful innovations.

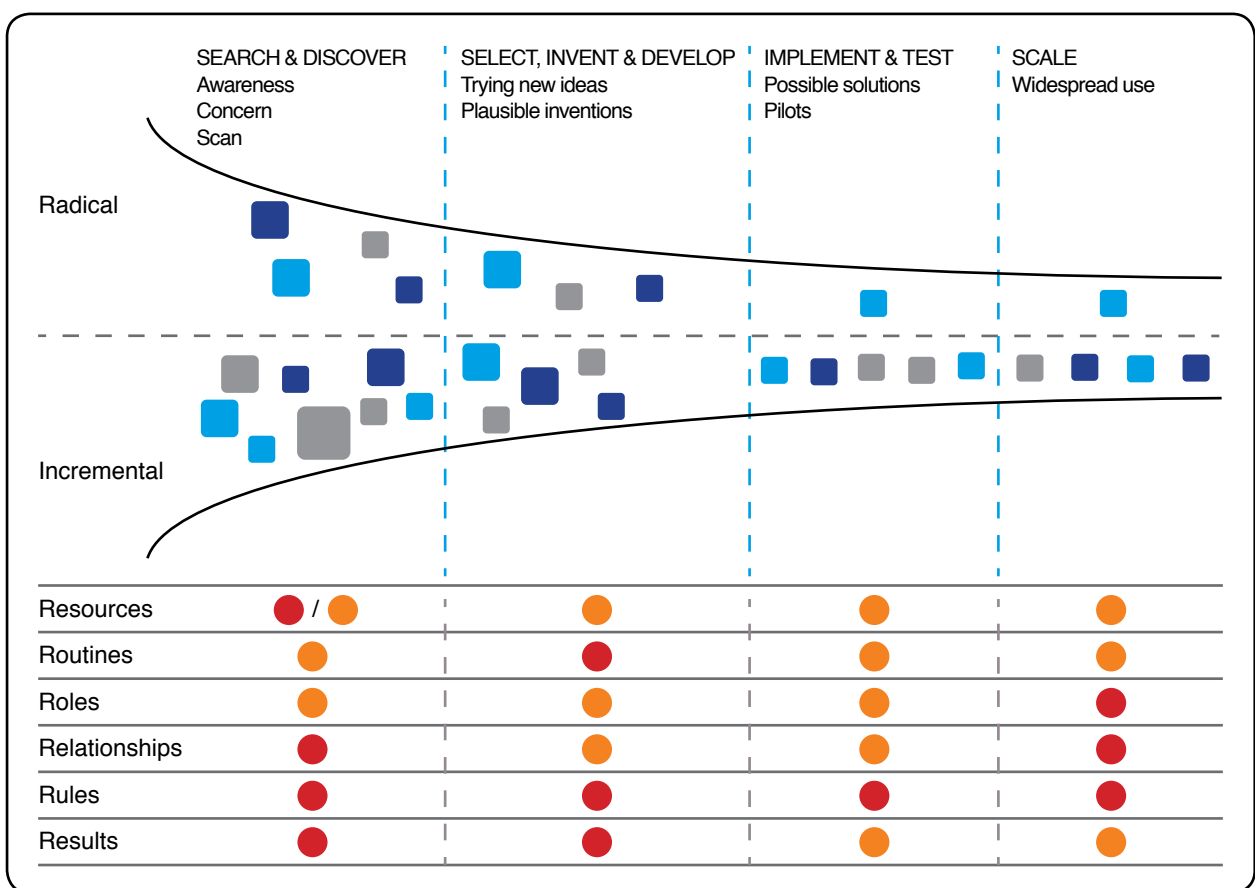


Figure 5: Innovation ecosystems – scaling

## Section 3: Findings, Conclusions and Recommendations

### 7 Summary Findings and Conclusions

The concept of the innovation ecosystem is contributing to significant changes in how policymakers, practitioners and scholars analyse, understand and support processes of innovation in different sectors of the economy and across different countries and regions.

As we show in this study, the concept can be used to enable a thorough and detailed analysis of the different components of the innovation ecosystem in a given industry or sector, how these components interact with each other, how this interaction facilitates effective innovation processes and what this means for the overall health of the ecosystem.

Our summary findings for our analysis of the humanitarian innovation ecosystem are as follows:

**Resources:** Inadequate and poorly distributed, and limited in support of exploratory and invention work; insufficient knowledge-based and operational infrastructure for innovation efforts. While resources are slowly growing, they are still far from adequate for the needs in the sector. The types of financial mechanisms commonly utilised are also not always the most appropriate for each of the stages of innovation management.

**Routines:** Insufficiently joined up across the innovation process; lack of in-depth engagement with innovation management and design good practice and ideas; often poorly aligned with the delivery focus of assistance. There are particular weaknesses in scanning, inventing and trialling new ideas. Many routines are borrowed from existing humanitarian procedures, which are not amenable to effective innovation management.

**Roles:** Narrowly focused on the usual suspects; dominated by key actors, with weak connections to academia, science, private sector, national counterparts and disaster-affected communities.

**Relationships:** Overtly contractual and insufficiently open and collaborative; focused on specific humanitarian actors at the centre of the innovation process, with limited novelty in partnership structures and arrangements; poor signals to, and networks with, actors outside the sector, especially the private sector, the research/scientific community, aid recipients and national and local actors.

**Rules:** Very little in the way of principles and approaches to innovation management; rules, incentives and policies of the wider sector typically limit innovation rather than acting as a driver and enabler.

**Results:** Weak generation and utilisation of the kinds of evidence and knowledge that could support effective innovation management, albeit with some important exceptions for successful innovations. Results are also poorly shared, within and across sectors.

The overarching conclusions of our analysis of the humanitarian innovation ecosystem are as follows.

#### 7.1 A number of resource, information and capacity gaps need to be addressed

The humanitarian innovation ecosystem is made up of many sub-systems relating to the different sectors. These do have a number of necessary components, which work with varying degrees of success, in pockets here and there across different sectors. However, few of the sub-sectors have all of the components necessary, and there are few genuinely sector-wide mechanisms that work to strengthen innovation across the entire system. As a consequence, the ecosystem has several specific *resource and capacity gaps, most notably in financing, information and skills. Resources need to be expanded and made more predictable, to provide end-to-end pathways for innovation, and to become more diverse in their scope and more tailored to specific innovation efforts. Innovation information, or 'intelligence', needs to be strengthened, to make the case for specific innovations, to support innovation processes and to assess the efficacy of new approaches. The ability to actively monitor and measure activity within the ecosystem will be integral to the development of innovation management best practice. On skills and capacities, there needs to be concerted investment in people and in training so as to enable those closest to the humanitarian 'coal face' to apply the best available knowledge to enhance operations.*

## 7.2 The ecosystem is weakly integrated and needs active facilitation, networking and brokering of relationships between existing and new actors

The components of the ecosystem are very loosely integrated with each other, with the exception of specific sub-sectors such as health, where there are more formalised interactions around processes such as evidence review. Some components might work well together in some settings, or for some innovations, but not in others. Very few, if any, actors have a mandate or a desire to facilitate better and more productive interactions around innovation processes. The ecosystem can be characterised as weakly and ineffectively networked, both internally and externally, and as having a rather ‘hollow core’. A key priority is to *strengthen and facilitate interactions and relationships across the ecosystem, both within specific sub-ecosystems and across them. Attention should also be paid to how the ecosystem can be made more open to new and excluded actors: end-users, scientists, private sector operators and non-traditional partners.* This last point is important because innovation has been recognised as a multi-player activity that requires high levels of connectivity, and we have found this to be true in the humanitarian sector. But ‘*open innovation*’ is not simply opening the door randomly to any new idea: it must be based on a core understanding of needs and the framework by means of which innovation translates ideas into value.

## 7.3 Innovation processes are idiosyncratic and subject to multiple interests and biases

The interactions of the ecosystem have a clear bearing on how innovations get supported, and the processes they go through to get selected, tested and diffused. The innovation ecosystem is not, to put it simply, a meritocratic one, where ideas get promoted because of their potential contribution to humanitarian goals. Instead, individual and group biases, institutional interests, marketing-driven agendas, fads and fashions all play a role in what gets picked up and used. There is, as a result, very little consistency or predictability in terms of how the ecosystem supports innovation processes. Therefore, another priority is to *strengthen innovation management processes across the ecosystem, to make them more objective and less partial to the vagaries of biases and fashions.* A particular focus should be on identifying methods and approaches suited to the extreme contexts of disasters and crises.

Finally, and on the basis of all of the above, we would conclude that, overall, the humanitarian innovation ecosystem is at a very early, embryonic stage of its development, and moving it forward requires a formal, dedicated mechanism with a mandate to put these changes in place. The innovation concept is itself new to the sector, with the first formal study dating back only six years.<sup>29</sup> The positive investments that have been made have been in support of specific innovation processes and not to strengthen the system. While the focus on the system is a welcome one from an analytical perspective, there are pragmatic considerations about whether the sector does indeed want to move towards actively strengthening the ecosystem. This will require sustained attention and investment. Therefore, a final and overarching priority is to *develop a global alliance that will work to strengthen the ecosystem in the short, medium and long term and take forward these other priority areas for change.*

We turn next to detailed recommendations under each of these priority areas.

<sup>29</sup> Ramalingam et al. (2009).

## 8 Recommendations, Next steps and Closing thoughts

Where innovation ecosystems work well and support on-going innovation management efforts, it is because there are sustained resources, rigorous innovation management processes and a system for adaptive learning. This is true regardless of the sector or the actors involved. But there are also particularities for the humanitarian sector that make innovation more challenging than it is in most other private or public contexts. The sector is also in the early stage of its innovation journey, and some of our critical findings need to be understood in this context.

Our conclusions and list of recommendations present a set of broad ideas on how the humanitarian innovation ecosystem might be strengthened. These are based on the vision of innovation playing a more central and higher-valued role within the evolving humanitarian landscape. In order for this vision to become a reality, actors inside and outside the sector must work towards a number of specific improvements. We present our view of what these improvements should be, based on our findings and conclusions.

### 8.1 Recommendations

#### *Priority 1: Address resource gaps and approaches*

- 1a)** Effort should be made to ensure adequate resource coverage for different stages of the innovation process, with particular attention to ensuring financing is made available to cover the full range of innovation activities from search and discovery through to scaling and is targeted across the humanitarian innovation ecosystem in general as well across different sectors.
- 1b)** Existing cross-sector humanitarian funding mechanisms should collaborate and coordinate to provide stronger and more predictable end-to-end financing processes for innovations. This should result in the establishment and communication of a common innovation funding 'pathway' to would-be innovators.
- 1c)** Specific attention and resources should also be paid to innovation scaling. A cross-funder mechanism should be established to provide tangible and visible support for scalable innovations that pass specific evidence-based criteria. This would generate dedicated resources for communications and advocacy, institutional support and networks with senior decision-makers inside and outside the sector as necessary.

Addressing this priority area will require concerted collaborative effort by government and private funders interested in and supporting humanitarian innovation processes. DFID, the Netherlands Ministry of Foreign Affairs, USAID and the Swedish International Development Cooperation Agency should consider convening a wider group, including new donors such as South Korea, the United Arab Emirates and Turkey, to discuss and agree ways forward. There should also be efforts to bring in other donors not typically involved in humanitarian responses but who do fund innovation, including private foundations such as the Bill & Melinda Gates Foundation, the Rockefeller Foundation, the Wellcome Trust and the William and Flora Hewlett Foundation. This effort should also include the major humanitarian innovation funding mechanisms such as the HIF and DIV.

#### *Priority 2: Address the lack of innovation information and evidence*

- 2a)** Invest in a sector-wide innovation knowledge management system to capture past, ongoing and new innovation management efforts, working across both sub-sectors and the sector as a whole. This will generate several different kinds of information, including reviews of the needs and opportunity for innovations in different sub-sectors; regular horizon scanning efforts in search and discovery of new humanitarian products and processes; and information on on-going innovations processes and their state of progress.
- 2b)** Support and invest in effective results-based processes in each stage of the innovation process, made relevant and appropriate to each humanitarian sub-sector with a specific focus on early-stage methods for proof-of-concept validation of inventions. Make better use of explicit indicators and hypotheses of success for new ideas, at different stages of the innovation management process, covering feasibility, possible value-added and potential scale.
- 2c)** Undertake regular health checks of the state of the humanitarian innovation ecosystem, ideally within wider analytical initiatives such as the OCHA Annual Review or the ALNAP State of the Humanitarian System.

Addressing these recommendations will require convening and supporting humanitarian operational research capacities to focus on innovation needs and opportunities in a systematic fashion. While this can be undertaken in a piecemeal, as-and-when, fashion, it is likely to be more effective if a network of actors undertakes this work, bringing together private sector innovation specialists, innovation management researchers, humanitarian NGOs and humanitarian analysts, who are tasked to work together to generate and disseminate innovation 'intelligence' as a public good for the humanitarian sector. This might best be achieved through the design and commissioning of a new humanitarian innovation research centre or network. The model of the Climate and Development Knowledge Network, funded by DFID, is a useful one to consider here.

### **Priority 3: Strengthen skills, capacities and enablers of innovation**

- 3a)** Invest in a facility for building shared skills and capacities for humanitarian innovation management, whereby humanitarians and wider actors come together to learn about how to best undertake innovation management in disaster response.
- 3b)** Enable better mentoring and support to emerging and established innovation entrepreneurs, inside and outside the sector, through a global 'humanitarian innovation fellows' programme.
- 3c)** Review existing humanitarian standards and frameworks in terms of their ability to enable (or constrain) innovation, and work with standards initiatives to incorporate innovation considerations into their work.

Addressing these recommendations might involve a third party innovation body with global recognition, such as Nesta or MindLab, getting involved in the innovation skills area, in collaboration with specific innovation funders and donors and the global learning network described below.

### **Priority 4: Strengthen and facilitate cross-ecosystem interactions and relationships**

- 4a)** Foster and develop new, cross-organisational partnerships to enable incorporation of design thinking and other innovation management methodologies within humanitarian operations and comparable conditions. This would result in a greater number of cross-organisational, cross-sector incubators and laboratories for developing and testing new ideas and approaches. Such activities would assist in the development of a shared vision and provide a link between diverse innovation efforts.
- 4b)** Develop and implement work on end-user-driven innovation in humanitarian contexts and its potential contribution to generating, prototyping and testing new ideas.
- 4c)** Establish a dedicated, open innovation platform for the sector, along the lines of InnoCentive, with a means for sharing identified needs on a common platform, with a broad network of possible solvers, and a means by which institutional and 'crowd-sourced' donors could fund specific solutions of interest.

These suggestions will require the convening of some form of global learning network that can bring together diverse actors to share experiences and ideas and to provide a platform for collaborative learning and the means for incubating new cross-sector initiatives. There is no exact equivalent in the humanitarian sector, although there are some interesting actor-specific examples such as the UN Innovation Network. ALNAP, as a multi-stakeholder network with a learning and capacity-strengthening agenda around performance and accountability, may be a good model to follow.

### **Priority 5: Strengthen innovation management processes**

- 5a)** Create and implement sound mechanisms and processes for horizon scanning, invention, piloting and testing and scaling humanitarian innovations. This should include better articulation of different routes and end-games for scaling different kinds of innovations. Similarly, innovation strategies should include the establishment of clear and simple guidelines for end-to-end innovation management processes, including the development of innovation business cases, for due diligence, and ethical principles for innovation management.
- 5b)** Invest in the development of trial methodologies and techniques for systematic comparison of specific innovations against existing and new approaches and against each other. These methods should involve triangulation of data on operational indicators of performance with recipient feedback mechanisms.
- 5c)** Develop specific protocols and principles for undertaking and managing innovation pilots, building on agile development principles, with scope for sector-specific variations and adaptations. These adaptations should recognise that there are multiple and diverse vehicles for realising innovation.

This should be undertaken and supported by credible organisations with skills in and knowledge of innovation management and the ability to work with humanitarian organisations to develop and test new innovation management approaches. Funders of innovation processes are critical here, as are operational organisations that will be using the processes. UN agencies potentially have a very important role to play here as standard-bearers, and might consider capitalising on this, along the lines of what WHO already does in health innovations.

### **Priority 6: Build a global alliance to strengthen the humanitarian innovation ecosystem**

- 6a)** One of the challenges of these recommendations is that there is no single party that should be taking these forward. A number of these suggestions point to the need for some new institutional arrangement that will work to prioritise humanitarian innovation and coordinate the distributed efforts of the sector and wider actors. To this end, it is recommended to establish some form of global alliance to bring together diverse actors to share experiences and ideas, raise funds, engage senior-level leadership, provide a platform for collaborative learning, incubate new cross-sector initiatives and provide a platform for addressing the weaknesses of the ecosystem in a systematic and sustained fashion. This would also help in the building of a shared vision within the sector and the ability to identify the new capabilities (and resources) needed and facilitate a move from a 'reactive' innovation mode to a more proactive one.

These recommendations cannot be enacted by humanitarian actors alone, but will require government, NGO, UN and private sector investments, working together to bring operational researchers, innovation experts, scientists and companies in hubs of expertise across the sector. There is no exact equivalent in the humanitarian sector, although there are some interesting examples in other sectors, most notably the GAVI Alliance in vaccines. Like GAVI, a global alliance for humanitarian innovation could be a new kind of actor in the sector, bringing together public, private and not-for-profit expertise to address market failures and drive innovation processes.

With sufficient and sustained investment in the priority areas above, the ecosystem could be moved onto a stronger, more systematic and predictable footing.

## 8.2: Next steps

- 1) These recommendations should be debated and discussed with DFID, OCHA and the study advisory group.
- 2) They should subsequently be shared with a wider network of actors, including those involved in the World Humanitarian Summit Innovation theme, and those involved in ongoing innovation initiatives.
- 3) Specific priorities should be developed, responsibilities allocated and a roadmap for action developed that includes the 2016 Summit as a critical step along the way.

## 8.3: Closing thoughts: the creative destruction of humanitarian aid

Our findings show a number of structural issues and systemic problems are facing the sector that serve to limit the effectiveness of the innovation ecosystem.

These issues include:

- short-term and reactive financing for assistance;
- the delivery focus of aid, with few investments between crises responses;
- an organisational culture and mind-sets that give prominence to existing operating procedures and widespread resistance to change;
- the insular, individualistic and competitive nature of humanitarian responders; and
- A lack of engagement with actors seen to be outside of response, including a longstanding and unjustifiable lack of engagement with recipients of aid.

Addressing these issues will be necessary to cement the role of innovation as a key element in aid effectiveness. This will require the letting go of old, outmoded approaches. Changes for the better in these areas would also, of course, support the effective delivery of humanitarian outcomes. They will not be straightforward or easy, nor will they happen quickly.

Based on our analysis, we believe such 'creative destruction' is vital for the humanitarian sector if it is going to maintain its relevance and reputation. Whether it is able to do this is still uncertain. While the interest and focus on innovation is a positive signal in this regard, effort must be made to keep it insulated from the entrenched politics and institutional interests that shape the sector.

Creative destruction through innovation is not easy in any sector, especially if attempted by existing and dominant players in that sector. Such change can and does happen, but it usually requires redefining the role and purpose of the sector and how it adds value, and some redistribution of power across a sector.

The humanitarian aid sector is ripe for such redefinition and redistribution. Indeed, we have seldom come across an example of a sector where such changes would be of so much benefit to so many people. If it does not adapt, capitalising on the opportunities afforded by the emerging innovation movement, humanitarian actors will have missed an opportunity to have more relevance, be more appropriate, have greater impact, ease more suffering and save more lives around the world.

# Appendix I: Details of Case Studies

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## Cash-based Programming in the Food Assistance Sector<sup>30</sup> Water, Sanitation and Hygiene<sup>31</sup>

For much of the past 60 years, the dominant design in the provision of food aid has been the transfer of surpluses to countries in need. During this time there has been a pattern of sustained incremental innovation along a trajectory that saw the challenge as one of supply push and finding ways to improve the process, product and targeting of food aid. In parallel, an alternative approach has emerged based around variations on a cash model – providing end-users with the resources to meet their own needs through local market mechanisms. This model grew bottom-up in a variety of contexts and for a long period was seen as a fringe activity without a strong evidence base and with relatively low acceptance. However, the past decade has seen a major expansion of cash programming and also a move from the fringes to becoming a mainstream activity, with an accumulation of experience around issues of how to deploy such innovations at scale.

This case study illustrates the role small-scale entrepreneurial activity has played, refining and defining a new model via a process of controlled experimentation with different models of delivery and technologies. Cash programming requires a new technological infrastructure with different skills, moving away from a supply and distribution model to one resembling more closely a financial system. It also moves from a centralised mode towards a decentralised network model, with corresponding shifts in power and influence. This has required a shift in the underlying business and mental models around food, reflected in the change of terminology from *'food aid'* to *'food assistance'*. It has required considerable adaption on the part of mainstream incumbents to a different 'mind-set' as well as adaption to the underlying structures and competencies to enable them to implement a radically new model. This has meant the learning of new ways of working.

The WASH innovation ecosystem functions in a reasonably coherent way, allowing for the identification of needs to be translated into viable innovations through the targeted allocation of resources. However, there is a strong tendency to encourage incremental rather than more radical innovations. Although the general picture is one of incremental change, priorities have shifted in recent years from a focus primarily on the water sub-sector towards encouraging greater innovation in sanitation. This shift is accompanied by changing patterns of resource allocation and indicates a degree of strategic direction in the innovation ecosystem. There have been direct efforts by key players in the WASH sector to evaluate where resources need to be directed in order to stimulate innovation. Nevertheless, the financial resources available for innovation are small and not especially well designed for supporting the whole innovation process. Most resources being provided are for the selection and development of the innovation process, with very little for adoption and diffusion.

In terms of roles and relationships, there is the basis for coordinated activity among a core network of actors driving the innovation agenda. This provides coherence and leadership to orchestrate the necessary relationships, resources and activities within the ecosystem but there is a danger of some external actors and opinions from beyond the 'usual suspects' being excluded. There is also a tendency to pursue familiar and lower-risk solutions. Some newer actors, including social enterprises, foundations and private sector firms, are beginning to influence the ecosystem, but there are still gaps and areas of disconnect, such as between private sector suppliers and universities and agencies/users.

Although there is a degree of coordination among key actors, the innovation ecosystem has been mostly *ad hoc* and informal. There have been some recent attempts to make it more systematic, especially in terms of understanding user needs and building up an evidence base, but rules around funding, national government influences and the need to manage risk during humanitarian crises all place limits on the type and degree of innovation. This emphasis on incremental innovation discourages potential innovators from becoming involved and limits the widespread diffusion of new innovations.

30 Bessant (2015) 'Case Study: Cash-Based Programming in the Food Assistance Sector', CENTRIM, University of Brighton.

31 Rush and Marshall (2015) 'Case Study: Innovation in Water, Sanitation and Hygiene', CENTRIM, University of Brighton.



## Shelter <sup>32</sup>

The study shows that the functioning of the innovation ecosystem in shelter is impeded by the demand-driven nature of shelter activity, the ad hoc nature in which participants engage with shelter activities, the sector's historically limited professionalism and the lack of emphasis on formal learning (or evidence collection). It shows that, while there is still a need for improvements in product innovation in the provision of emergency shelter, many of the solutions proposed are either inappropriate or unaffordable. It also highlights that innovation in shelter today is likely to be concerned more with improvements in process than with the introduction of new products, and that, because of urbanisation and the increasingly spatial nature of disaster response and recovery, it is increasingly concerned more with *facilitation* than with *direct actions*.

This case study illustrates how resources are largely allocated to mandate-holders and traditional actors in the sector, with very little designated for innovation. Priorities are focused on infrastructure projects that satisfy donor agreements. An ethical resistance to experimentation, coupled with a weak resource pool reinforced by restrictions in the funding system, means room for innovation is limited. National organisations and the communities they serve, while having the potential to be important sources of innovations, have largely divorced from process. There is, however, a growing interest among professional groups and major private sector actors, which open up the possibility of filling some of the gaps within the ecosystem. Partnerships between cluster members and commercial manufacturers and emerging social enterprises offer the potential to drive innovation within the sector, while academia could fulfil the function of 'critical friend', although it has, as yet, largely failed to act in this manner.

## Emergency Disease Responses <sup>33</sup>

After food aid, health is the second-largest sector of global humanitarian assistance and managing communicable disease makes up a significant proportion of this work. Infectious diseases are a major cause of deaths and ill health in humanitarian crises, and this case study looks across contrasting examples to identify strengths and weaknesses within the innovation ecosystem. The current Ebola outbreak means innovation in communicable disease response is high on the agenda in the humanitarian sector, in particular the emphasis on drug development to better treat infected patients. However, as the case study illustrates, effective treatments are just one part of the humanitarian communicable disease response, with innovation required and occurring in activities including diagnostics and assessment, prevention, surveillance, outbreak control and disease treatment and management.

Effective innovations in humanitarian responses to infectious disease outbreaks can fall into any one of these specific areas of work. There have been some notable successes, among them the development of new diagnostics for TB and new approaches to disease prevention, surveillance and treatment and management. There have also been successful innovations within crisis responses, such as the response to polio outbreaks in Syria. But there have also been notable failures, including ineffective utilisation of innovations in rapid responses, such as in the cases of Ebola in West Africa and cholera in Haiti.

The case study reveals an ecosystem that is good in certain parts but heavily reliant on a number of critical internal actors and on external capacities and resources. While significant financial resources are available for R&D in infectious diseases, few of these are directly targeted at humanitarian work and they are not accessible by humanitarian organisations, but are instead made available for actors outside of the sector to develop new diagnostics, protocols, drugs and treatments. While it is recognised that bringing new solutions into emergency settings requires humanitarian medical knowledge and expertise throughout the process, a general lack of operational research capacity limits the testing of new ideas.

<sup>32</sup> Gray and Bailey (2015) 'Case Study: Shelter Innovation Ecosystem', CENTRIM, University of Brighton.

<sup>33</sup> Ramalingam (2015) 'Case Study: Innovations in Emergency Disease Responses', CENTRIM, University of Brighton.

This case study documents the level and deployment of funding in the humanitarian sector being provided by the main bilateral donor agencies, multilateral donors and UN agencies, NGOs, the Red Cross movement and private sector foundations and firms. Funding for innovation is still in its early stages, but overall financing for innovation is low (less than 0.7% of overall humanitarian funding), there are insufficient financing mechanisms or platforms and support to the piloting and scaling of innovations is insufficient. Because most of the explicit innovation funds have only been in existence for between three and five years, the approaches of these funds and the learning from them are only just beginning. Nevertheless, imperfections in the market and the non-financial nature of the value created by the innovations in the sector mean establishing what constitutes a good investment can be particularly tricky. With insufficient financial stages available, there is currently an issue of pilot programmes not building enough of an evidence base to convince funders to back the innovation at the scaling stage.

This case study identifies the need for better indicators of risk, evaluation frameworks and portfolio management techniques – particularly as many of the innovations developed, and documented in the other case studies, have little commercial value and therefore little chance of creating a sustainable business model outside of targeted humanitarian donors and agencies paying for them. Because they are investing public funds, most donors are naturally risk-averse and need to be seen to be investing in a prudent manner. The challenge of choosing the wrong solution is a strong factor for funders; consequently, the dominant paradigm trickles down through the aid chain (and throughout the innovation ecosystem) as such donors set their funding criteria and incentives. The case study draws an important distinction between donors that are investors in future impact – and thus in innovation – and customers of proven impact.

<sup>34</sup> Gray and Hoffman (2015) 'Case Study: Finance for Humanitarian Innovation'. CENTRIM, University of Brighton.

# References

- ALNAP (Active Learning Network for Accountability and Performance) (2012) *The State of the Humanitarian System*. London: ALNAP.
- ARC (American Red Cross) and IFRC (International Federation of Red Cross and Red Crescent Societies) (2015) 'A Vision for the Humanitarian Use of Emerging Technology for Emerging Needs: Strengthening Urban Resilience'. Washington, DC, and Geneva: ARC and IFRC.
- Bastable, A. and Russell, L. (2013) 'Gap Analysis in Emergency Water, Sanitation, and Hygiene Promotion'. London: HIF.
- Bessant, J. (2015) 'Case Study: Cash-Based Programming in the Food Assistance Sector'. Brighton: CENTRIM, University of Brighton.
- Bessant, J., Ramalingam, B., Rush, H., Marhsall, N., Hoffman, K. and Gray, B. (2014) 'Innovation Management, Innovation Ecosystems and Humanitarian Innovation'. Literature Review for the Humanitarian Innovation Ecosystem Research Project. Brighton: CENTRIM, University of Brighton.
- Betts, A. and Bloom, L. (2014) 'Humanitarian Innovation: The State of the Art'. Policy and Studies Series. New York: OCHA.
- Blanchet, K., Sistenich, V., Ramesh, A. et al. (2014) 'An Evidence Review of Research on Health Interventions in Humanitarian Crises'. London: LSHTM.
- DFID (Department for International Development) (2012) 'Promoting Innovative and Evidence-Based Approaches to Building Resilience and Responding to Humanitarian Crises: A DFID Strategy Paper'. London: DFID.
- DFID (Department for International Development) (2014) 'Promoting Innovation and Evidence-Based Approaches to Building Resilience and Responding to Humanitarian Crises: An Overview of DFID's Approach'. London: DFID.
- Gray, B. and Bailey, S. (2015) 'Case Study: Shelter Innovation Ecosystem'. Brighton: CENTRIM, University of Brighton.
- Gray, I. and Hoffman, K. (2015) 'Case Study: Finance for Humanitarian Innovation'. Brighton: CENTRIM, University of Brighton.
- HMG (Her Majesty's Government) (2011) 'Humanitarian Emergency Response Review'. London: HMG.
- James, E. and Dargis, J.R. (2013) 'A Study on Protection and Accountability in Haiti following the Earthquake in January 2010: Findings from the Field'. London: Disasters Emergency Committee.
- Jha, A. (2010) *Safer Homes, Stronger Communities: A Handbook for Reconstructing after Natural Disasters*. Washington, DC: IBRD and World Bank
- OCHA (UN Office for the Coordination of Humanitarian Affairs) (2013) *Humanitarianism in the Networked Age*. New York: OCHA.
- OCHA (UN Office for the Coordination of Humanitarian Affairs) (2015) *World Humanitarian Data and Trends 2014*. New York: OCHA
- Ramalingam, B. (2015) 'Case Study: Innovations in Emergency Disease Responses'. Brighton: CENTRIM, University of Brighton.
- Ramalingam, B., Scriven, K. and Foley, C. (2009) 'Innovations in International Humanitarian Response'. London: ALNAP.
- Rush, H. and Marshall, N. (2015) 'Case Study: Innovation in Water, Sanitation and Hygiene'. Brighton: CENTRIM, University of Brighton.
- Rush, H., Marshall, N., Hoffman, K., Gray, B., Ramalingam, B. and Bessant, J. (2014) 'The Components of the Humanitarian Innovation Ecosystem'. Interview Summary for the Humanitarian Innovation Ecosystem Research Project. Brighton: CENTRIM, University of Brighton.
- UNDRO (UN Office of the Disaster Relief Co-ordinator) (1982) 'Shelter after Disaster, Guidelines for Assistance'. Geneva: UNDRO.
- USAID (US Agency for International Development) (2014) *Local Systems: A Framework for Supporting Sustained Development*. Washington, DC: USAID.
- WHO (World Health Organization) and UNICEF (UN Children's Fund) (2013) 'Strategic Plan for Polio Outbreak Response'. Geneva and New York: WHO and UNICEF.



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