Supporting disabled people in emergencies: Motivation's appropriate and affordable wheelchairs

Matt Thomas and Alice Obrecht

CASE STUDY

HIF humanitarian innovation fund

ALNAP

The **Humanitarian Innovation Fund (HIF)** supports organisations and individuals to identify, nurture, and share innovative and scalable solutions to the challenges facing effective humanitarian assistance. The HIF is a programme managed by ELRHA. **www.humanitarianinnovation.org**

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About the authors

Matt Thomas is a Researcher at Jigsaw Consult

Alice Obrecht is a Research Fellow at ALNAP

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Front and back cover: A potential user tries out the emergency wheelchair during the second trial in Kenya, 2013. Credit: Motivation

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HIF-ALNAP case studies on successful innovation

This study is one in a series of 15 case studies, undertaken by ALNAP in partnership with ELRHA's Humanitarian Innovation Fund (HIF), exploring the dynamics of successful innovation processes in humanitarian action. They examine what good practice in humanitarian innovation looks like, what approaches and tools organisations have used to innovate in the humanitarian system, what the barriers to innovation are for individual organisations, and how they can be overcome.

About the case studies

Case study subjects are selected from a pool of recipients of grants from the HIF, (£75,000-150,000). The HIF awards grants for each stage of innovative practice[1]: grants of up to £20,000 are available for the recognition, invention, and diffusion stages, and grants of up to £150,000 can be obtained to support the development and implementation stages. The HIF selects grantees on the basis of a variety of criteria designed to achieve a robust representation of the range of activity in humanitarian innovation.

The case study subjects are chosen to reflect innovation practice in the humanitarian system. They cover information communication technology (ICT) innovations and non-ICT innovations, and they offer a balance between innovations that have reached a diffusion stage and those that have not. They also reflect the wide geographic range of the areas where innovations are being trialled and implemented. (For more information on the methodology and criteria used to select case study subjects, see the forthcoming 'Synthesis report' for the case study series).

About HIF-ALNAP research on successful innovation in humanitarian action

These case studies are part of a broader research partnership between ALNAP and Enhancing Learning and Research for Humanitarian Assistance (ELRHA) that seeks to define and understand what successful innovation looks like in the humanitarian sector. The ultimate aim of this research is to improve humanitarian actors' understanding of how to undertake and support innovative programming in practice. This research partnership builds on ALNAP's long-running work on innovation in the humanitarian system, beginning with its 2009 study, Innovations in International Humanitarian Action, and draws on the experience of the HIF grantees, which offer a realistic picture of how inno-vation actually happens in humanitarian settings.

Innovation is a relatively new area of work in humanitarian action, yet it is one that has seen exponential growth in terms of research, funding and activity at both policy and programming levels. While the knowledge base around innovation in the humanitarian sector is increasing, there remain a number of key questions for humanitarian organisations that may be seeking to initiate or expand their innovation capacity. The HIF-ALNAP research has focused on three of these:

Primary research questions

What does successful humanitarian innovation look like?

What are the practices organisations can adopt to innovate successfully for humanitarian purposes?

Secondary research question

What are the barriers to innovation in the sector and how can they be mitigated?

The case studies will be used to produce a synthesis document that addresses these three questions. The outputs of this research are aimed at humanitarian organisations interested in using innovative practices to improve their performance, as well as organisations outside the humanitarian sector, such as academic institutions or private companies, seeking to engage in innovation in humanitarian action.

1. About this case study

Organisation	Motivation
Partners	Handicap International (HI); Johanniter International (JUH)
Project	Appropriate and Affordable Emergency Wheelchairs

Grant	Invention	Implementation	Diffusion
Start date	October 2011	September 2012	April 2015
Grant period	6 months	22 months	6 months
Total HIF budget	£19,992	£149,640	£19,990
Location	Pakistan, Global	Global, Kenya, Philippines	Germany, New Zealand, UK

The **Appropriate and Affordable Emergency Wheelchairs** case study describes how **Motivation**, in partnership with Handicap International (HI) and Johanniter International (JUH), developed a wheelchair and training package for use in emergency response contexts.

The aim of the innovation process was to develop a wheelchair that would offer clear improvements over the donated orthopaedic wheelchairs currently used in emergencies. Both Motivation's and HI's experience in emergency response and with disabled individuals contributed to a strong understanding of the problem. The final product offers an improvement over current humanitarian practice by providing users with a more appropriate, comfortable, light-weight, durable and adjustable wheelchair that meets international standards. Throughout the project, Motivation sought the input of end users and partners, proactively identifying opportunities for learning, capturing learning on a regular basis and feeding this information back into the design process.

The product and the training package have been utilised in both the Typhoon Haiyan response and the immediate aftermath of the Nepal Earthquake in May 2015.[2] At the time of completing this case study, the limited focus on diffusion means a wider audience has yet to adopt the innovation.

Research for this case study was desk-based, drawing on a review of project documents and 9 interviews with key project and partner staff in early 2015.

2. The Problem

According to the 2011 World Report on Disability, more than 1 billion people in the world live with some form of disability, of whom nearly 200 million experience considerable difficulty in functioning.

It is believed the rising prevalence of disability owes in part to an ageing population and an increase in debilitating illnesses. Those with disabilities have poorer health outcomes and higher rates of poverty than people without disabilities.[3] This is partly because disabled individuals face barriers in accessing the services the majority of people take for granted. These barriers increase in less advantaged communities, making the disabled one of the most vulnerable groups.[4]

In an emergency, the existing vulnerability of disabled people is compounded by their immobility and dependence on others, their lack of access to life-saving relief efforts and the risk of life-threatening health complications. Moreover, injury means the percentage of the population with some form of disability increases in an emergency situation.[5] Recent tsunamis and earthquakes in China (Sichuan), Haiti, Pakistan (Kashmir) and Sri Lanka left 886,846 people injured, many of whom required a wheelchair.[6] However, no appropriate wheelchairs are currently available to meet the needs of people who are injured or have lost their existing wheelchair in an emergency situation.

The following problems associated with wheelchairs currently being supplied in emergencies need to be addressed:

- Unavailability: wheelchairs are slow to arrive
- Inadaptability: they are second-hand and therefore hard to adjust to specific needs
- The design, durability and quality tend to be adapted for hospital use and inappropriate for the rough terrain and challenging environments typically involved in emergencies
- They do not meet international standards
- They have no accompanying training package for the user/carer
- They have no support or pressure-relieving qualities to help prevent life-threatening complications such as pressure ulcers

Given the increasing frequency of large-scale natural disasters and the rising number of disabled people within communities, Motivation and HI recognised the need for an appropriate and affordable emergency wheelchair was greater than ever.

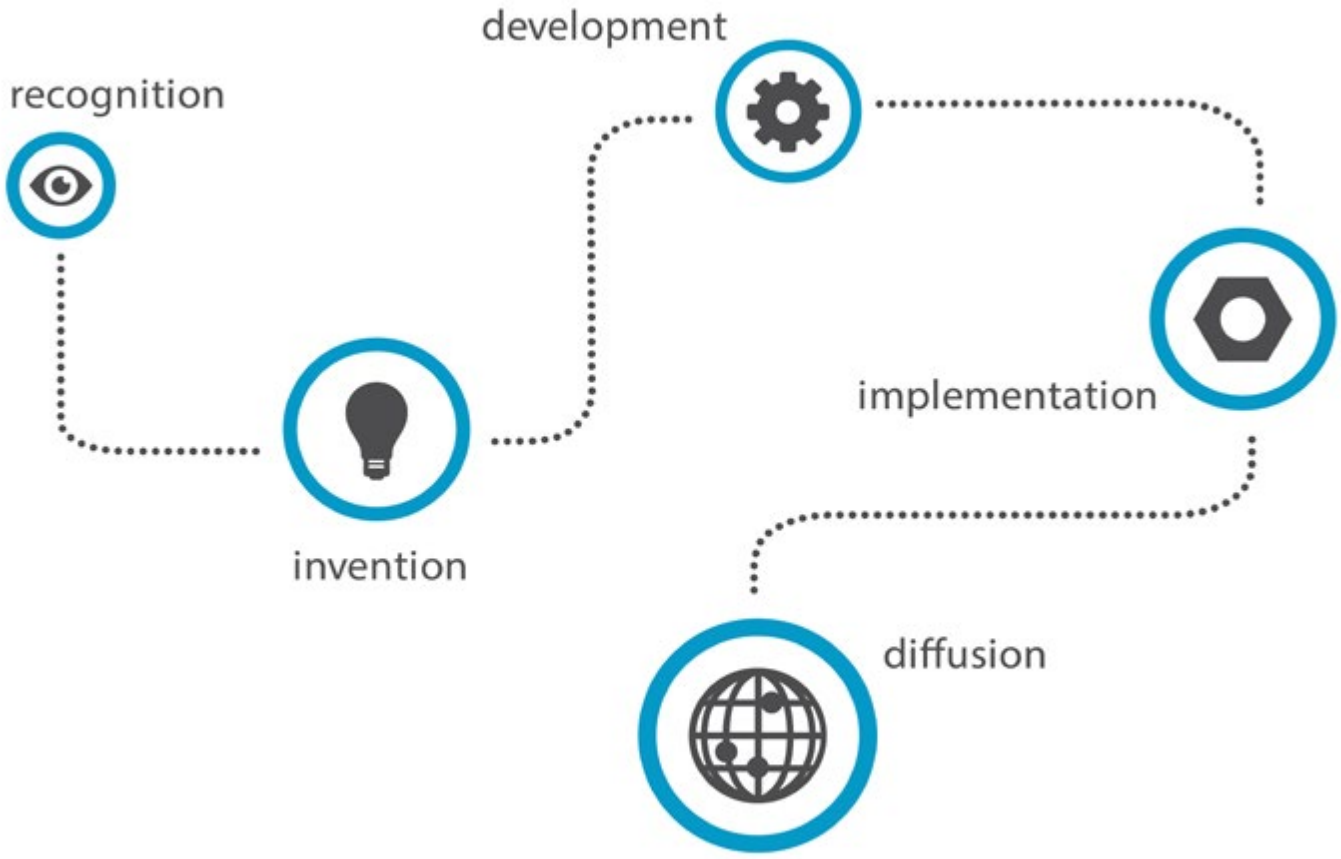
Motivation and HI also sought to indirectly address a deeper problem underlying the challenges around the quality and quantity of wheelchairs in emergency services: lack of sufficient awareness in humanitarian organisations of the needs of disabled people in an emergency response.

3. The innovation process

The stages through which successful innovations progress are often unpredictable and dynamic in nature, but there are often similarities. It is therefore useful to understand this innovation process when trying to capture why particular innovations succeed or fail.

There are various models to describe the innovation process, but HIF uses a model based on five stages:

- **Recognition** of a specific problem, challenge or opportunity to be seized
- **Invention** of a creative solution or novel idea that addresses a problem or seizes an opportunity
- **Development** of the innovation by creating practical, actionable plans and guidelines
- **Implementation** of the innovation to produce tangible examples of change, testing it to see how it compares with existing solutions
- **Diffusion** of successful innovations – taking them to scale and promoting their wider adoption



These five steps provide a useful archetype for the innovation process and are used in the HIF case study methodology. But they come with the caveat that innovation is complex and non-linear, and that identifying deviations from this model is just as important as (and possibly more so than) confirming the applicability of the model itself. The HIF-ALNAP case studies will seek to map in greater detail the chronology of these stages and how they overlap and interact for each HIF grantee.

3.1 Recognition

Both HI and Motivation had identified the need for a mobility device suitable for emergency response scenarios over several years of practical engagement in emergency response contexts. In particular, experiences in Sri Lanka after the 2004 tsunami, Pakistan after the 2005 earthquake and Haiti after its earthquake in 2010 presented both organisations with first-hand experience of the challenges disabled individuals faced in emergency contexts. Motivation and HI spoke regularly with mobility device users in each of these contexts to help build a picture of need.

Those who have mobility issues struggle to access life-saving services and resources. Lack of mobility products also affects the efficiency with which health services are able to respond. The need for an appropriate, affordable, lightweight 'emergency wheelchair' that is available immediately for emergency response deployment was clear. This type of device, with its unique specifications, did not exist on the market.

Prior to this project, HI and Motivation had worked together for more than 20 years. As part of their strategic partnership, they seek to collaborate on projects in which they can combine their complementary skills and experience. Motivation is an international disability charity that provides

Photo: Wheelchair user with one of the 44 emergency wheelchairs distributed during the Typhoon Haiyan (Yolanda) response in December 2013. Credit: Motivation

wheelchairs and programming with the aim of helping disabled people stay healthy, get mobile and play an active role in the community. HI has been working in the disability sector for 33 years and routinely witnesses first-hand the impact of emergencies on populations around the world and the heightened vulnerability of the disabled community during those emergencies.

3.2 Invention

Between November 2010 and the end of 2011, HI and Motivation began their initial discussions on this problem and how they could design a wheelchair more appropriate for emergency contexts. The HIF small invention grant, awarded in autumn of 2011, provided the necessary financial resources and impetus to begin the invention process in earnest.

From October 2011 onward, Motivation and HI worked closely on the invention. Collectively, the Motivation team had more than 60 years' experience designing and developing wheelchairs, drawing on both technical and clinical specialists, but its practical understanding of the emergency response context was less advanced. HI outlined for Motivation the key requirements and capabilities of the wheelchair, and these were fed into the initial design brief. The following specifications were given:

- To meet international standards;
- Lightweight and compact in terms of shipping size (for transportation and storage);
- Easily transportable and easily foldable for storage;
- Adjustable fit (for a range of sizes) with adjustable seat depth and footrest height;
- Durable (no need for maintenance) through steel construction and tubeless tyres with solid foam;
- Capable of dealing with rough terrain (to evacuate people and for self-propulsion);
- Adjustable axle position (for the different weight distribution of double amputees);
- Swing-away footrests;
- Affordable, so organisations can order large numbers, reaching more people;
- Rapid assembly (using hand tools) and simple to assess and fit;
- Highly visible frame colour.

In order to better understand the problem context for this innovation, Motivation attended an emergency response simulation run by JUH to learn about the environment the wheelchairs would be entering and the complexity of the distribution process for service providers.

HI's specifications, combined with the experience of Motivation staff, ensured a strong product design brief that was referred to throughout the project delivery and that dictated project milestones. The quality of the initial brief was a key factor in the success of the end product.

Motivation and HI also recognised the importance of creating a simple training package to accompany the product. Training enabled those without extensive health care experience to distribute the wheelchairs and fit them to the end user in an emergency response setting.

3.3 Development

Having completed the invention with the small HIF grant, Motivation secured the large HIF grant to develop and implement the wheelchair in September 2012. Motivation immediately set about developing the wheelchair using its standard product design methodology, which includes:

- Identifying a design specification;
- Evaluating existing products;
- Developing the design;
- Producing and trialling prototypes;
- Finalising design;
- Identifying and defining tools and training; and
- Designing, developing and prototyping tools and training.

Design

Design decisions were made on the basis of the common disabilities encountered in emergency situations and the environment in which the wheelchair would be used. Motivation had to balance several competing demands in the design of the prototype. For example, the wheelchair needed to have a strong, durable and robust structure that could withstand potentially rough terrain yet also had to be simple, lightweight and easy to construct.

Having developed the design brief with HI, Motivation also finalised a statement that defined the scope of the emergency wheelchair, to guide field workers as to the contexts in which they could use it.

Production

A factory in China was selected to develop the prototype. Most of the world's wheelchairs are already produced in China, which means costs are lower and parts readily available. After two prototypes were produced and reviewed by HI, a final prototype was approved and sent to the International Organization for Standardization (ISO)-certified testing centre in China to undergo a range of tests. Design was modified until the wheelchair obtained ISO certification and met World Health Organization (WHO) wheelchair guidelines.

Service package

The emergency wheelchair service package was also developed to accompany the wheelchair and facilitate assembly and deployment. This package included wheelchair set-up directions, an emergency assessment and fitting procedure, a user instruction manual and a user feedback form. Draft versions of these documents were produced and reviewed by HI at its headquarters in Lyon and JUH.

3.4 Implementation

Field-testing

Having developed an ISO-certified prototype and service package, Motivation undertook a series of field trials. A field trial protocol was agreed with HI, including field trial documentation (participant briefing, questionnaires and clinical feedback forms). Field tests were done in Pakistan by HI and subsequently in Kenya by Motivation. The trials were important in securing feedback from end users and making the necessary adjustments to the prototypes. The training package was also trialled in these field tests.

Training

HI and JUH staff were trained as trainers in emergency wheelchair response in order to prepare them for possible future deployment. Motivation conducted the train-the-trainer training at HI headquarters in Lyon. Motivation captured lessons from this process – for example the need to keep documentation to a minimum and pass on training quickly and simply to the field. The necessary changes were made to the training package before running a training session in Frankfurt for JUH.

Stockpiling

A major part of implementation involves stockpiling a product in the right place, ready for deployment in an emergency. The emergency response wheelchairs were stockpiled at the HI and JUH emergency response depots in Dubai and Frankfurt, respectively. HI stored 200 wheelchairs and JUH 100.

Deployment

Typhoon Haiyan struck the Philippines in November 2013, injuring more than 28,000 people and leaving millions homeless. Motivation worked with HI and JUH to deploy the emergency wheelchairs in the immediate aftermath of the disaster. HI deployed an international team to Tacloban and attempted to send 100 wheelchairs in mid-December. Due to a variety of reasons concerning the emergency logistics coordination in HI's centre in Dubai and the cost of air freight, the wheelchairs only arrived in the Philippines the first week of January. At this point, HI faced a further hurdle getting the wheelchairs through customs: HI had recently changed its organisational status to a federation, and had yet to re-register, as required, in the Philippines. As a result, Motivation and HI agreed in mid-January not to attempt to distribute the wheelchairs in the Philippines as part of a response to the Typhoon, as three months had passed and the period of time for which the wheelchairs would have their maximum impact—in the immediate aftermath of a disaster—had now passed. The wheelchairs were released from customs in late February 2014 and remain in HI's warehouse in the Philippines for potential use in a future crisis.

In the meantime, JUH air freighted 50 wheelchairs from its Frankfurt depot to Cebu as part of a Lufthansa relief flight, which was provided at no cost. The wheelchairs arrived in the country on 22 November and passed customs without problem. Working with partners, JUH distributed 44 wheelchairs to affected people in the Ormoc Region.

As a further example of how Motivation continually sought out opportunities for learning, in January 2014 Motivation staff went to the Philippines to conduct a monitoring visit. They visited some of the wheelchair users to assess whether the wheelchairs had been fitted properly, if training had been passed on and to receive feedback on the quality of the wheelchairs. This was also an opportunity to learn from the different approaches of its two implementing partners, HI and JUH, in order to identify lessons for future response partnerships.

There were a number of key findings from the Philippine distribution, such as those related to the inappropriate quantity of each wheelchair size category available and lack of an elevated leg rest. This feedback was passed on to the designers and developers, and a new prototype iteration was worked on. The non-linear, cyclical nature of the design process means invention and development often run alongside implementation and diffusion in the continued search for improvement.

3.5 Diffusion

The emergency wheelchair has gained some attention and was shortlisted for an innovation award at the international development event AidEx in October 2013. Motivation's Co-founder and President David Constantine was given the Guardian International Development Achievement Award for 2013 for 'innovative wheelchair design'.

Motivation applied for its third grant from HIF, a diffusion grant, in spring 2015 and is currently carrying out diffusion activities. Diffusion is a challenging stage in an innovation process because it requires innovators to move beyond demonstrating the effectiveness of an innovation in one or two contexts and to convince potential users that their innovation is more widely effective: in short, grantees can take their innovation 'to scale' only if they can convince a wide audience of potential users it will work for them and is better than their current way of working.

Recognising the problem of inappropriate wheelchairs in emergency contexts was the result of a deeper challenge – a lack of awareness of the needs and interests of disabled people – Motivation has focused on awareness-raising activities in its diffusion stage. Realising that 'the diffusion of ideas is an evolving process'[7], Motivation has identified two key target groups for diffusion. First is humanitarian actors, to raise awareness of the wheelchairs and of the needs of disabled people in emergencies, and second is organisations within the disability sector, to raise awareness of the emergency wheelchair.

For the first group, Motivation has provided training to the UK International Emergency Trauma Register (UKIETR), a roster of surgeons, anaesthetists, emergency physicians/nurses and other supporting medical, nursing and paramedical personnel who are interested in responding to large-scale emergencies overseas. Motivation has also worked with the Disasters Emergency Committee (DEC), the British Organisation for Non-governmental Development (BOND) and other international non-governmental organisation (NGO) groups to raise awareness of the emergency wheelchairs and the importance of addressing the needs of disabled people in emergencies more effectively.

For the second group, Motivation has reached out to the World Federation of Occupational Therapists (WFOT) and the International Disability and Development Coalition (IDDC). Motivation also attended the International Society for Prosthetics and Orthotics (ISPO) World Congress in Bangalore, India, and gave a presentation about the emergency wheelchair project. As ISPO is the network that informs the sector and the ISPO Congress is a large forum, this gave Motivation the opportunity to introduce the emergency wheelchair to a wide audience and encourage diffusion.

As noted, a number of small adjustments are being made to the chair design following feedback from implementation in the Philippines. Motivation also carries out annual reviews of all its products, which are likely to highlight other small improvements to be addressed. The organisation also has 150 chairs in stock in Dubai, ready for use in the next large-scale emergency, and is seeking to engage other large agencies in distribution. As this case study is being written, emergency response wheelchairs are being distributed in Nepal following the 25 April 2015 earthquake.

Photo: Motivation's emergency wheelchairs being used after the Nepal Earthquake, April 2015. Credit: Motivation

4. Was this a successful innovation process?

Inherent in all innovation processes is some degree of failure. This presents a challenge to understanding what contributes to a good innovation process: even successful processes will experience difficult pilots or setbacks in design or diffusion. The HIF-ALNAP research on innovation processes therefore distinguishes between a good innovation – an output of an innovation process that leads to measurable gains in effectiveness, quality and efficiency – and a good innovation process. This research defines a successful innovation process through three criteria:

Table: Criteria of success for innovation processes

Increased learning and evidence	There is new knowledge generated or an enhanced evidence base around the problem the innovation is intended to address, or around the performance of the innovation itself.
Improved solution	The innovation offers a measurable, comparative improvement in effectiveness, quality, or efficiency over current approaches to the problem addressed by the innovation.
Adoption	The innovation is taken to scale and used by others to improve humanitarian performance.

Through the research process for the case studies, ALNAP and HIF are also seeking to understand how HIF grantees define success in their work, in order to identify unexpected or unacknowledged benefits from engaging in innovation.

The research team used evidence collected for this case study to assess the success of the Appropriate and Affordable Emergency Wheelchairs innovation process against the above three criteria.

Overall, the process was successful in developing a product and training package that to a large degree fulfils the initial brief. While no studies have been carried out to compare the emergency wheelchair with a standard orthopaedic wheelchair, wheelchair users have scored the emergency wheelchair highly in terms of satisfaction. As Motivation has only recently begun diffusion, it is too soon in the lifespan of the project to determine whether it will be successful in securing wider adoption of the wheelchair and training package.

Specifically, findings for the three success criteria were as follows:

Increased learning and evidence

The emergency wheelchair innovation has generated new knowledge around the issue of providing disabled individuals with appropriate solutions in an immediate post-disaster setting, in addition to new knowledge around the way Motivation conducts innovation itself.

Improved solution

In terms of quality, both the wheelchair and the accompanying training package for service providers have received positive feedback from partner organisations and wheelchair users. An evaluation was conducted in the Philippines following the distribution of the emergency wheelchair in the immediate aftermath of Typhoon Haiyan. In a survey conducted for an impact assessment, end users gave the following ratings for the wheelchair:

Table: Questions on how the user is satisfied with the assistive device received[8]

	Terrible	Unhappy	Mostly Dissatisfied	Mixed	Mostly Satisfied	Pleased	Delighted
Size	0%	7%	0%	0%	29%	36%	29%
Weight	0%	0%	0%	0%	21%	50%	29%
Ease to move from place to place	7%	0%	0%	7%	7%	50%	29%
How the wheelchair looks	0%	0%	0%	0%	7%	50%	36%
Easy to use	0%	7%	7%	14%	7%	36%	29%
Product preparation time	0%	0%	0%	7%	7%	43%	43%
Reliability	0%	0%	0%	0%	7%	71%	21%
Meets user's needs	0%	0%	0%	14%	0%	36%	50%
Fitting - time it took to get	0%	0%	0%	7%	0%	43%	50%
Instructions: maintenance & repairs	7%	0%	0%	14%	0%	36%	43%
Instructions: user training	0%	7%	0%	7%	0%	57%	29%

Motivation has also aimed to keep the cost of the wheelchair below £100, in response to humanitarian organisations' concerns around cost-efficiency. Overall, therefore, they filled their brief for an appropriate, reliable and affordable emergency wheelchair.

However, comparing this with previous approaches to serving people with limited mobility in emergencies in order to establish whether Motivation's wheelchair provides an improvement over the prior status quo approach has proved challenging. The status quo approach of humanitarian organisations to addressing this problem has ranged from distributing donated orthopaedic wheelchairs to not addressing the needs of disabled people at all. In many cases, people living with disability have obtained chairs themselves, usually getting ex-hospital wheelchairs to use at home. These chairs are really designed for use inside a hospital.

While there are no studies contrasting satisfaction rates between emergency wheelchairs and orthopaedic wheelchairs, the highly positive responses on the emergency wheelchair users are promising. Motivation is currently seeking to establish this comparative benefit through reports from the Nepali Earthquake response.

While the wheelchair may provide an improvement in terms of its appropriateness and quality for disabled people, it is more expensive than using donated wheelchairs or providing no mobility assistance to disabled people whatsoever. Therefore, the question of enhanced cost-efficiency comes down to the priorities established by donors and implementing organisations and their view of supporting people living with disability. While humanitarian organisations may spend more funds than previously providing these wheelchairs, they are also providing an arguably valuable new service to a part of the population that is often excluded from disaster response efforts. And this can have a ripple effect in terms of how humanitarians interact with and serve disabled people more broadly.

As Sarah Sheldon, Motivation's Project Manager, reflected, 'the success of this innovation goes beyond the successful design, development and delivery of a workable product, and raises the profile of disabled people within emergency response […] Having a product means you can approach people, engage them and have a larger conversation around the issue of disability.'

Therefore, insofar as providing services to disabled people in emergency response offers an improvement over failing to provide these services, the emergency wheelchair and accompanying training package have made a clear improvement to how humanitarians deliver assistance.

Adoption

While Motivation has fully engaged with this element of the project, as yet the innovation has not been taken to scale and other humanitarian organisations are in the early stages of adopting the innovative product. While adoption of humanitarian innovation can take time, given infrequent opportunities to implement, lessons have already been learnt with regard to more appropriate marketing strategies and the need for improved planning and resourcing of the diffusion stage.

6. What are we learning about innovation?

Drawing on research from the humanitarian sector and beyond, including previous case study material, HIF has identified a range of factors generally held to be fundamental to successful innovation processes. An important part of the case study research lies in testing, through the experience of the HIF grantees, the extent to which these propositions hold true in humanitarian settings.

- **Managing relationships and setting common objectives**

  Innovation always involves multiple actors – partners, implementers and end users – all of whom can change over the different stages of an innovation process. Assigning specific time and resources to managing these relationships and ensuring common objectives across the different stakeholders of an innovation will contribute to a successful innovation process.

- **Dividing tasks and responsibilities**

  Given the complexity of many innovation processes, a clear division of tasks and responsibilities between individuals and organisational units is important for developing a successful innovation.

- **Resourcing an innovation**

  Working in innovation requires flexibility to deal with the unknown, and this is particularly so with an innovation in the humanitarian sector. Budgets and resource plans therefore need to be suitably flexible to accommodate several possible outcomes (e.g. the need for further trials) as well as likely deviations from the original plan.

- **Flexibility of process**

  At its heart, managing an innovation process is about creating space for flexibility. Processes featuring flexible timelines, feedback loops for adaptation during the piloting phase and individuals resourced to execute changes in response to emerging results will be more likely to succeed.

- **Assessing and monitoring risk**

  Innovation processes in humanitarian action need to have an appropriate relationship to risk. We expect processes will be more likely to produce improved solutions and achieve uptake when they include an assessment of the different risks that might have an impact on the effectiveness of the innovation, as well as a strategy or plan to monitor and adjust development in light of changes in these risks on an ongoing basis.

- **Drawing on existing practice**

  Knowledge of existing practice and experiences is expected to contribute to more effective innovations through a better understanding of past attempted solutions, an accurate initial understanding of the problem or opportunity addressed by the innovation and an awareness of potential users and their needs.

Findings for these six propositions are presented in the graphics on the next few pages.

Managing relationships and setting common objectives

How this factor worked in this case study

According to Motivation staff, the initial brief is the most important element of the innovation process, in part because it clearly frames the objective from the beginning stages of innovation. Motivation referred to this document throughout the project delivery to ensure it was developing an appropriate product that met the need. Motivation did not use any sophisticated project management tools, but did use its tried and tested product design methodology, accompanied by standard project management approaches such as Gantt charts and project milestones. Motivation knew from experience how many people were needed in each phase and how long it would take.

Sarah Sheldon, the Motivation Project Manager, coordinated all communication and acted as point person, liaising with partners and between departments. She held face-to-face meetings with all the key actors at the start of each phase of the project, in which everyone was given an opportunity to share, objectives were outlined and timeframes put in place. A large lesson-learning workshop was held at the conclusion of the project.

HI brought a wealth of emergency response experience to the innovation project, but Motivation was keen to incorporate more than just one voice in this area because the product would need to work for all organisations engaging in humanitarian response operations. JUH was therefore invited to be involved, and gave feedback on both the product and the training. It also engaged in the implementation phase, which enabled Motivation to distribute the emergency wheelchair in the Philippines after Typhoon Haiyan.

Challenges

None identified by research.

How this factor related to the performance of the innovation process

This innovation process benefited from strong relationships both with the partner organisations and with end users. Heavy engagement with partner organisations and wheelchair users enabled Motivation to maintain a clear and common objective across its work. Feedback from partners and wheelchair users was collated and given to the Motivation design team, which was able to adjust the design and create an improved prototype that addressed the concerns raised. This ensured the chairs were appropriate and met the needs of the key stakeholders.

In addition to this, Motivation has strategic partnerships with both HI and JUH, with a history of working together on successful projects. This project was therefore built on the back of tried and tested working relationships and a partnership with a shared objective.

Dividing tasks and responsibilities

How this factor worked in this case study

The key Motivation staff involved in this project, Sarah Sheldon, Chris Rushman, Stefan Constantinescu and Sarah Frost, had worked together for more than 20 years. This depth of working relationship and understanding of each other's skills and abilities, forged over time, ensured efficient processes and systems and the ability to easily play to each other's strengths.

The teams at Motivation and HI have worked together on numerous tasks before, often in stressful and time-pressured environments, and so know each other's strengths and weaknesses and how best to communicate with one another. This made allocating tasks and responsibilities much easier and was a key factor in the successful delivery of this innovation.

Challenges

None identified by research.

How this factor related to the performance of the innovation process

Sarah Sheldon, Motivation Project Manager, says having a small team of highly experienced and skilled individuals ensures the innovation process runs smoothly and is easy to manage. It was important to have one person in charge of the project, to coordinate all communication and ensure the technical experts blocked out enough time to commit to the task. The nature of innovation tasks is that they very often fit around the standard workflow, meaning the project manager needs to manage the innovation carefully to ensure all parties give it the required priority and attention.

Resourcing an innovation

How this factor worked in this case study

Chris Rushman explained innovation was a core component of Motivation's standard design processes, and the organisation was always looking for innovation opportunities within the sphere of its expertise. Budget restrictions usually restrict this, however.

During the recognition and invention phases, Motivation planned the entire project, ensuring the necessary resources for each stage. Learning was captured throughout the innovation process, the human resources had significant experience and were able to design and develop an effective innovation and a plan was in place to implement the final product.

Challenges

Sarah Sheldon said that, if they were to run the project again, she would ensure more funding was available for testing and to resource a trained staff member to lead all the testing in each of the countries, and that more funds were ring-fenced for logistics, particularly transportation, as experience demonstrated that these areas were under-budgeted.

How this factor related to the performance of the innovation process

This case study highlights the importance of reliable and flexible resources for supporting a successful innovation process. The three HIF grants provided to Motivation have enabled the emergency wheelchair team to resource the lifespan of its innovation process. At the time of writing this case study, the critical stage of diffusion had only recently begun, making it difficult to assess the overall relationship between resources and uptake of an innovation.

However, the HIF diffusion grant has enabled Motivation to work flexibly thus far to identify appropriate avenues for awareness-raising in order to achieve uptake of the wheelchair and training package. As an example of the 'trial-and-error' style learning that is inherent in the diffusion stage, Motivation staff have observed that working with larger bodies such as BOND and DEC provides greater benefits for diffusion than does attending large conferences.

Flexibility of process

How this factor worked in this case study

Motivation recognises innovation projects do not progress through the identified innovation stages in a linear fashion, and flexibility needs to be built into the project in order to provide space for many iterations and feedback loops. Throughout the project lifetime, design, development and implementation ran in parallel.

Motivation's approach to flexible programming is based around the Potential Problem Analysis (PPA) methodology developed by Charles Kepner and Benjamin Tregoe.[9] The method involves brainstorming potential problems that could arise for each milestone of a project, identifying their causes, assigning a rough risk number for these problems and then developing 1) plans to mitigate, or reduce, the chance of the problem arising and 2) contingency plans in case the problem arises. Motivation refers to its particular use of the PPA method as 'protecting the plan' (see below under 'Assessing and monitoring risk').

Challenges

Implementing an innovation process in an emergency response context exposes an organisation to external factors beyond its control. The most obvious of these is the question of whether a disaster will occur within the project timeframe and provide a context in which to test, improve and implement the innovation product. The lack of such a disaster, though good news, limited Motivation's ability to implement its product and receive feedback required for further improvement. Sarah Sheldon mentioned that HIF was very flexible, agreeing to a project extension and understanding the situation, which was again a key factor in the project's success.

How this factor related to the performance of the innovation process

One key area identified as requiring flexibility of both time and budget was the ISO accreditation process. As a result, Sarah Sheldon ensured there was sufficient time and budget available in the event of initial ISO certification failure, which was an important factor in the project's success.

A key factor mentioned previously but also important in relation to this success factor is the value of engaging end users and wider stakeholders from the outset of the project. Creating a flexible project that builds in time to collect, process and make changes in response to the input from end users was a critical factor for success in this case study. Involvement of a wide range of users at the early stages also ensures effective planning and resourcing and limits the need for changes to the design at a later stage.

Assessing and monitoring risk

How this factor worked in this case study

Motivation carried out a standard approach to risk analysis for the HIF application process. As part of Motivation's standard approach to project planning, the team also drew up a more detailed list of risks, which were then monitored over the lifespan of the project. Motivation's approach to risk assessment and monitoring is referred to internally as 'protecting the plan': recognising the key objectives of the innovation at the outset, identifying the threats to achieving these objectives and then taking action to prevent or mitigate these throughout the innovation process to 'protect' the plan.

The Motivation team begins its risk assessment process for an innovation by looking forward 6-12 months in time and brainstorming what the project will look like if it 'goes terribly.' As a team exercise, staff then identify what would have to happen or fail to happen for this worst case scenario to come about, and then create strategies for mitigating or preventing this possible scenarios. These strategies are then built into the project plan.

Challenges

Throughout the course of the project, Motivation and partners faced a number of setbacks, for example HI's inability to get the chairs into the Philippines, suggesting the need for a more detailed risk assessment exercise.

How this factor related to the performance of the innovation process

Motivation recognises risk is inherent within innovation and embraces that risk as an inevitable element in innovative design. Because Motivation's approach to risk assessment is so closely linked to its approach to flexibility and managing projects fluidly, there was insufficient evidence to determine the unique relevance of risk assessment and monitoring to creating a successful innovation in this case study.

Drawing on existing practice

How this factor worked in this case study

Motivation has a rich history to draw on. The core team, comprising Sarah Sheldon, Sarah Frost, Chris Rushman and Stefan Constantinescu, has over 60 years of wheelchair design and development experience between them. The majority of this experience has been at Motivation, and so the strength of relationship, the knowledge of each other's' working styles and the familiarity with each other's' strengths ensured many 'quick wins' and efficient project delivery.

Challenges

None identified by research.

How this factor related to the performance of the innovation process

The experience of Motivation staff and their partners was one of the greatest strengths of this innovation process and a key factor in its success. The ability to draw on over 60 years of wheelchair design and development experience in addition to established processes, as well as HI's awareness of the potential users and their needs, ensured the final product was a success. Past experience did not limit creative design but rather guided it efficiently towards an appropriate innovation.

Additional potential contributing factors to successful innovation found in this case study

Creating a culture of honesty and openness

At the outset of an innovation process, it is important to create an environment in which all staff involved feel able to suggest ideas without fear of criticism. This encourages creativity and innovation and is a strong foundation to build on. In this example, Motivation Project Manager Sarah Sheldon gathered all staff likely to be involved in the project for an initial ideas-sharing meeting at the outset of the project, where staff members were presented with a figurative blank canvas and encouraged to suggest ideas connected to the project.

Engaging the wider organisation in innovation

The emergency wheelchair team at Motivation created monthly blogs or internal lunch-time presentations and supported 'champions' – individuals with a sufficient level of influence and visibility to be effective ambassadors – to disseminate the innovation and support potential scale-up. Engaging the wider organisation in the innovation as the emergency wheelchairs team did in this case helps get the innovation adopted beyond the immediate working group and encourages greater ownership within the organisation.

Using appropriate non-emergency settings for early pilots

Motivation learned that testing does not always need to be in an emergency setting, even if the product is for an emergency context. In this project, the most important issues for the wheelchair were its adaptability and how it handled the terrain. So the organisation was as successful trialling in Kenya as it was in Haiti or Pakistan.

Building a diverse team

Richard Frost, CEO of Motivation, said it was significant that designers and not just engineers were part of the innovation team. The former bring a creative, more innovative, approach to problems and a new set of skills, provided they are managed in a well-structured format.

7. Emerging lessons for best practice in innovation

- For actors outside the humanitarian sector, building a network of contacts, rather than relying on a partnership with a single agency, is critical to understanding how the system works, how diverse it is, and where to target diffusion efforts;
- Building a diverse team with sufficiently overlapping areas of skill can enable an innovation process to benefit from diverse perspectives while also supporting a fluid shifting of roles and responsibilities to respond to the demands of the process;
- It is important to design an innovation project with a strategy for diffusion in mind. It is important to have thought about the end users and how to reach them with the final product, and showcase the benefits of the innovation;
- Successful innovation processes may not need to predict or anticipate every risk; rather, the point is to build a process that is resilient to risk, by identifying potential threats to the objective and mitigation strategies early on.

Endnotes

1. ELRHA, http://www.elrha.org/hif/funding/core-grants/, accessed 26 October 2015.
2. It is understood HI deployed some of the emergency wheelchairs in Nepal following the earthquake on 25 April 2015.
3. WHO (World Health Organization) and the World Bank (2011) World Report on Disability. Geneva: WHO.
4. Ibid.
5. UN Enable, http://www.un.org/esa/socdev/enable/dispaperdes2.htm, accessed 10 June 2015.
6. ELRHA, http://www.elrha.org/project/appropriate-and-affordable-emergency-wheelchairs/, accessed 10 June 2015.
7. Interview with Sarah Sheldon, Project Manager for Motivation.
8. Xavier, C.A. (2014) 'Impact Assessment: Emergency Wheelchair Response in the Philippines'.
9. For a useful overview, see: http://www.innovation-portal.info/wp-content/uploads/Potential-problem-analysis.pdf

Other case studies from HIF and ALNAP on innovation

Words of relief: Translators without Borders' local language translation for emergencies

Innovations in international humanitarian action: ALNAP's 8th Review of Humanitarian Action

HIF Case Studies

Mobile Technology – Listening to the Voice of Haitians

Gaza Risk Reduction and Mitigation

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Humanitarian Innovation Fund
ELRHA
1 St John's Lane
London EC1M

ALNAP
Overseas Development Institute
203 Blackfriars Road
London SE1 8NJ
United Kingdom
Email: alnap@alnap.org