



Building resilience through mobile-enabled solutions:

Lessons from the Mobile for Humanitarian Innovation Fund

April 2021



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GSMA Mobile for Humanitarian Innovation

The GSMA Mobile for Humanitarian Innovation programme works to accelerate the delivery and impact of digital humanitarian assistance. This will be achieved by building a learning and research agenda to inform the future of digital humanitarian response, catalysing partnerships and innovation for new digital humanitarian services, advocating for enabling policy environments, monitoring and evaluating performance, disseminating insights and profiling achievements. The programme is supported by the UK Foreign, Commonwealth & Development Office.

Learn more at www.gsma.com/m4h or contact us at m4h@gsma.com

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Executive summary

In September 2017, with support from the UK Foreign, Commonwealth & Development Office (FCDO), the GSMA launched the Mobile for Humanitarian Innovation Fund.¹ The Fund aimed to catalyse partnerships that would deliver innovative, mobile-enabled solutions to improve how those affected by disaster and crisis engaged with those providing assistance, whether humanitarian agencies, NGOs, governments or private organisations.

After receiving applications from 274 organisations requesting over £44 million to fund innovative solutions in 97 countries,² five mobile-enabled solutions were funded in the inaugural round to help **strengthen the resilience of communities experiencing or at risk of crisis**. These solutions were implemented throughout 2019 and 2020, generating lessons and impact that reached over 100,000 people in communities across five countries within the grant timelines. These solutions have continued to be scaled out, collectively reaching over 2.2 million people.

¹ This was originally launched as the Disaster Response Innovation Fund, but was renamed when the GSMA Mobile for Humanitarian Innovation (M4H) programme was launched in early 2018. The M4H programme marked an evolution and expansion of the GSMA's disaster response work.
² GSMA. (2018). [Key Trends from the Inaugural Round of the GSMA Disaster Response Innovation Fund](#).

GRANTEE PROJECT	PROJECT DESCRIPTION	TECHNOLOGY USED
  Communities in Haiti Access New Technologies for Early Warning/Response (CHANTER) 📍 Haiti	Interactive messaging to provide communities with information to help them prepare for and response to extreme weather events.	Interactive Voice Response (IVR) and Short Message Service (SMS)
  Fire detection and insurance 📍 South Africa	Network sensors and insurance services build more resilient communities by enabling them to better respond to and recover from fire in informal settlements.	Mobile-enabled smart fire sensors and SMS
  LevelApp 📍 Uganda	Strengthening the financial resilience of displaced and host communities by connecting them to private sector-funded supplementary income opportunities via smartphone.	Smartphone app, machine learning and mobile money
  FlowKit 📍 Ghana and Haiti	Automated analysis of de-identified call detail records (CDR data) provide mobility information to humanitarian responders and decision makers in the development sector in low- and middle-income countries (LMICs).	Big data analytics
  Nokia Saving Lives 📍 Philippines	Private wireless connected drones to support first response activities of the Philippines Red Cross to emergencies, including access to broadband connectivity and data streaming for search and rescue analytics	Drones and LTE connectivity



This report shares the key lessons from these innovative solutions. They are structured into seven overarching lessons that were identified in a detailed systematic review of all evidence and documentation generated across the portfolio (see [Appendix for Methodology](#)). Together, these lessons could help other innovators reflect on how to implement early-stage innovations using the power of mobile technology. These lessons fall under three broad interconnected themes: users and context, partnerships and operating models.



Users and context

Lesson #1

Innovators need to build trust with end users

Building initial trust and buy-in with end users is critical to the success of a new product or service. While this is often a labour and resource intensive process, it can have an invaluable impact on building resilience. Lessons from GSMA grant projects show that building trust can be most effective when done through face-to-face engagement or via an introduction from known and trusted entities (such as organisations already providing services that users value).

Lesson #2

Innovators need to ensure they truly understand the local context, including prospective service users

Activities to research and understand the local context (particularly the physical connectivity infrastructure and overarching regulatory environment) and potential users should be an ongoing process in the life cycle of any mobile-enabled innovation. This includes not only the piloting and implementation phases, but also when the project scales up or replicates in a new context. When expanding, the design of the innovation needs to be tailored to the local context. Differences in the technological landscape, regulations, cultures and norms all need to be taken into account.

Lesson #3

Equitable access is a key consideration in mobile-enabled innovations

Disaster does not affect all groups equally. The most marginalised in society are likely to experience the negative impacts of disasters more acutely, and are the most likely to be excluded from preparedness and resilience planning. It is therefore essential that digital solutions do not exacerbate this situation for marginalised and vulnerable groups, such as women, older people and persons with disabilities. Distribution and delivery channels need to consider, among other things, gender norms and patterns of inequality. Before launching, humanitarian innovation projects must ensure that the technical design will not further exclude any marginalised groups or compound existing access issues (such as the mobile gender gap).



Partnerships

Lesson #4

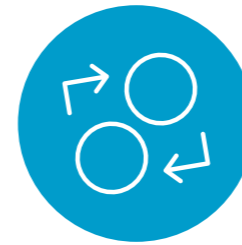
Successful mobile-enabled innovations often require buy-in from multiple stakeholders whose expectations are aligned

Mobile humanitarian innovations are unique and, by design, require input from multiple stakeholders. To create a successful partnership, the motivations of these stakeholders must be aligned. There are three notable types of partner organisations to consider: mobile network operators (MNOs) which the vast majority of mobile-enabled innovations will need to succeed, as well as humanitarian organisations and governments (buy in from both will be essential to gain permissions and eventually mainstream successful pilots).

Lesson #5

Partnerships will be successful and sustainable when they capitalise on their unique competencies

Once innovators have successfully engaged partners in the delivery of a mobile-enabled humanitarian solution, the structure and quality of these relationships will often determine the success, sustainability and level of scale of the innovation. Innovators should consider the unique competencies of their partners, especially when collaborating with organisations from new sectors. It is also essential to ensure that the roles and responsibilities of all partners are clear from the beginning, and strong communication and collaboration mechanisms are established. Where possible, interactions should be built on partnership models rather than simply service delivery.



Operating models

Lesson #6

Innovators need to carefully consider who will ultimately pay for their mobile-enabled innovation

A key part of ensuring that a mobile-enabled humanitarian innovation is financially sustainable is considering who will be paying for the service. Within the grantee portfolio, three overarching models were evident. In some cases, communities will pay as service users. Other models create revenue through partner organisations, such as paying private sector clients or implementing humanitarian agencies. Finally, some innovations rely on on-going donor funding, with evidence indicating that some donors are willing to provide this.

Lesson #7

Mobile technology introduces unique scale and sustainability considerations that innovators need to address

Innovations that use mobile technology to deliver humanitarian services have unique barriers and enablers to reaching sustainability and peak scale. The GSMA Innovation Fund portfolio features several novel factors that other innovators should take into account, such as ensuring innovator teams include people with appropriate technical skills, and that implementation gives due consideration to the resource and technical requirements for recruiting and registering service users.



Introduction

Mobile networks and the connectivity they provide can be a lifeline for those affected by sudden-onset disasters and protracted humanitarian crises. In September 2017, with support from the UK Foreign, Commonwealth & Development Office (FCDO), the GSMA Mobile for Humanitarian Innovation (M4H) programme launched the Disaster Response Innovation Fund. The Fund aimed to catalyse partnerships that would deliver innovative mobile-enabled solutions to improve how those affected by disaster and crises engaged with those providing assistance, whether humanitarian agencies, NGOs, governments or private organisations.

The Fund called for solutions that leveraged mobile technology to save lives, alleviate suffering and maintain human dignity during and after human-induced crises and natural disasters, as well as prevent disasters and strengthen disaster preparedness. The GSMA was specifically interested in solutions that supported the development of resilient communities, either by empowering those already affected by crisis or strengthening the capabilities of those at greater risk to prevent, prepare for and respond to disaster.

After receiving applications from 274 organisations requesting over £44 million (\$61 million) to fund innovative solutions in 97 countries,³ five mobile-enabled solutions were funded in the inaugural round to help strengthen the resilience of communities experiencing or at risk of crisis. These solutions were delivered throughout 2019 and 2020, with grantees learning, iterating and ultimately reaching over 100,000 people in communities across five countries.

³ GSMA. (2018). [Key Trends from the Inaugural Round of the GSMA Disaster Response Innovation Fund.](#)

Each project was led by a primary implementing organisation:

Mercy Corps | ING



Lumkani | Social enterprise



Flowminder Foundation | Non-profit



REFUNITE | International NGO



Nokia Saving Lives | Corporate non-profit



This report shares the key lessons of these innovative solutions. It begins by focusing on the implementation and impact of each solution, providing a case study detailing its success to date and identifying key considerations for the future. It then shares seven main lessons drawn from the collective lessons of the Innovation Fund portfolio. These lessons were identified in a detailed systematic review that synthesised over 100 pieces of evidence, seven in-depth interviews and a workshop. This process helped to maximise the lessons from the Fund and provide insights for other innovators seeking to leverage the power of mobile technology to strengthen the resilience of people and communities in crisis.



The Mobile for Humanitarian Innovation Fund Portfolio



Mercy Corps

PROJECT:	Communities in Haiti Access New Technologies for Early Warning/Response (CHANTER)
SUMMARY:	Interactive messaging to provide communities with information to help them prepare for and respond to extreme weather events.
TECHNOLOGY:	IVR and SMS
BUSINESS MODEL:	Funding from humanitarian programming budgets
COUNTRY:	Haiti
GRANT PERIOD:	October 2018 to March 2020

Mercy Corps is a global NGO that has been working in Haiti since 2010. They received a grant from the GSMA to run their CHANTER project in partnership with social enterprise Viamo, which in turn partnered with Haitian MNO Digicel. Mercy Corps also coordinated with the Haitian Government. The grant-funded project aimed to support communities by limiting loss of income, better protecting households and reducing the risk of physical harm from sudden onset disasters, which are becoming increasingly frequent in Haiti.

By leveraging IVR technology through Viamo's mobile communication platform, and using Digicel's network, CHANTER is designed to deliver a 12-week curriculum on extreme weather preparedness and first response practices, as well as early warning messages. Messages are tailored to recipients' locations and livelihood activities to ensure they receive relevant information.

The team used human-centred design approaches to co-create the curriculum and deliver it in three communes: Arcahaie, Bayonnais and Camp-Perrin. CHANTER was supported on the ground by a network of community-based organisations. The team purposefully included organisations that support women within the community and included women in their human-centred design process. As a result, they exceeded their target of 40 per cent female participation in the programme by 28 per cent.

Overall, 16,672 people registered on the CHANTER platform, of whom 11,763 listened to over 75 per cent of the messages. While there were thankfully no major weather events in Haiti during the grant, an evaluation of the service found that 84 per cent of users took an action suggested to them. It also found that over 99 per cent of users felt that the information that they received was relevant to them, and 99 per cent thought the CHANTER platform was useful.

A number of CHANTER users also reported proactively sharing key information from the messages with other people in their community, acting as a conduit for those without access to phones or who had simply not signed up to the service.

"I told the neighbours what to do when a disaster hits the community. And after the disaster ends, I would visit people to see if there were any victims."

Woman, farmer

Building on the lessons from the CHANTER project, Mercy Corps has developed five additional projects in partnership with Viamo. These projects aim to reach 2.5 million people across three countries in the Americas. One of these projects is LAVE (meaning "Wash" in Haitian Creole), which is using the CHANTER approach to deliver messaging to vulnerable populations in Haiti to reduce the spread of COVID-19. The service has reached over two million people to date.



Lumkani

PROJECT:	Fire detection and insurance
SUMMARY:	Network sensors and micro-insurance services help communities build resilience by enabling them to better respond to and recover from fire in informal settlements.
TECHNOLOGY:	Mobile-enabled smart fire sensors and SMS
BUSINESS MODEL:	Humanitarian funding for free sensor installation and user payments for insurance
COUNTRY:	South Africa
GRANT PERIOD:	June 2018 to June 2019

Lumkani is a South African social enterprise that uses innovative early warning systems with low-cost inclusive insurance products to provide safety and financial security for their clients. They seek to address the challenge of fires in urban informal settlements and townships in South Africa and across the globe. Lumkani received a GSMA grant to install mobile Internet of Things (IoT)-enabled fire sensors inside homes in informal settlements across South Africa at no cost to users. The project was made possible through partnerships with Hollard Insurance and Islamic Relief.

Lumkani fire sensors mitigate fire risk through a networked alarm that provides live monitoring and SMS alerts to residents and their neighbours. The alarm provides instant notification of fire events, triggering a swift community response. Users are also able to opt in to a micro-insurance scheme that insures their homes and possessions against damage or loss to fire.

During the grant period, Lumkani installed 20,182 fire sensors free of charge, providing cover to 66,478 people. Users also purchased micro-insurance for over £2.5 million worth of property. The devices enabled early response to 94 per cent of fire events that occurred during the project, preventing them from spreading and causing additional damage. An evaluation found that 87 per cent of users felt safer once they were installed.

As a result of automated SMS messaging and networked alarms alerting households and communities to fire, six in 10 service users (58 per cent) reported changing the way they respond to fires. These features also enabled a faster and more effective response from the community, with 91 per cent of households reporting that they would respond to an alert from a neighbour's sensor.

The presence of a detector also increases confidence in responding to fire events since it gives the community more time to react. In the event of a fire, 87 per cent of households with a device feel that they can find the source and tell others (compared with 76 per cent without the device), and 47 per cent strongly agree that they will know what to do if there is a fire (compared with 24 per cent without a device).

“When the sensor goes off, it helps us to know that there is a fire that has broken out, and we can resolve the matter before it becomes serious.”

Woman, service user

Service users who opted for the micro-insurance reported feeling more confident when they leave their homes for an extended period and that, due to the cover, they feel much less fearful and anxious. Around half of these households also reported feeling more financially secure and more inclined to buy valuable possessions due to purchasing the Lumkani micro-insurance product.

“The Lumkani device actually woke me to go and check and I saw the fire. I got my children and we got out a small window. If it wasn't for the Lumkani device which woke me up, I would have lost my life.”

Man, service user



REFUNITE

PROJECT:	LevelApp
SUMMARY:	Building the financial resilience of displaced and host communities by connecting them to private sector-funded supplementary income opportunities via smartphones.
TECHNOLOGY:	Smartphone app, machine learning and mobile money
BUSINESS MODEL:	Funding from private sector clients
COUNTRY:	Uganda
GRANT PERIOD:	June 2018 to January 2020

REFUNITE is a non-profit technology organisation with the primary aim of helping refugee families that have lost contact with each other during escape from conflict. They empower displaced people to take the search for missing loved ones into their own hands, whether through a mobile phone, a computer or a helpline. They received a grant from GSMA to pilot LevelApp, a new venture that supports displaced populations in becoming more financially resilient.

LevelApp provides users with supplementary income to label and categorise images on their smartphones. This activity “trains” machine learning algorithms to categorise similar images automatically. Users receive mobile money transfers based on the volume of images they process. The global market for such data annotation tools is expected to reach \$1.6 billion by 2025,⁴ promising huge potential for impact if LevelApp can tap into this market effectively.

The pilot aimed to provide 4,000 refugees and host community members in Kiryandongo Refugee Settlement and in Kampala, Uganda, with supplementary income. At the end of the grant, nearly 29,000 users had downloaded and used LevelApp and an additional 18,000 potential users were on a waiting list, an impressive level of demand.

Over 30 per cent of LevelApp users are women, and an independent evaluation of the pilot did not find any notable differences in the amount of money earned or how earnings were used based on the gender or nationality of users.⁵

Over £120,000 was paid to users during the pilot, and 100 per cent of users interviewed for the evaluation said they had successfully received a payment to their mobile money account. This was especially important for those users without alternative sources of income, as it helped them to meet their immediate needs. Users reported they used the money primarily for mobile data, airtime and groceries. Users also reported spending some of their earnings on family and friends, indicating a potential “spill over” effect in their communities.

During the course of the grant, users categorised over 230 million images with 97 per cent accuracy on average, proving LevelApp’s potential as a global data annotation tool. With this in mind, the team is hoping to bring on private sector clients with large datasets that could be categorised by LevelApp users. This would lead to commercial sustainability for LevelApp and provide sustainable supplementary income sources for users that are not linked to donor funding.

⁴ Grand View Research. (2020). [Data Annotation Tools: Market Size, Share and Trends Analysis Report](#).

⁵ Participants from Uganda, South Sudan and Democratic Republic of the Congo were included in this analysis.



FLOWMINDER.ORG

Flowminder

PROJECT:	FlowKit
SUMMARY:	Automated analysis of call detail records (CDR) provides mobility information to humanitarian responders in low- and middle-income countries (LMICs).
TECHNOLOGY:	Big data analytics
BUSINESS MODEL:	Donor funding to develop and provide open source (free) to users, with optional fee-based consultancy support
COUNTRY:	Ghana and Haiti
GRANT PERIOD:	July 2018 to February 2020

Flowminder is a non-profit foundation that uses mobile operator, geospatial and survey data to improve the well-being of vulnerable populations in LMICs. They provide information and capacity strengthening to governments, MNOs, national and international agencies and researchers, and have developed sustainable partnerships with numerous MNOs in LMICs for humanitarian and development purposes. Flowminder’s mission is to enable decision makers to access the data they need to transform the lives of vulnerable people, at scale. The organisation is striving to create a world in which decisions that can improve the lives of vulnerable people are based on the most appropriate evidence.

Flowminder received a GSMA grant, in addition to support from DIAL, to develop and release FlowKit, a system that would rapidly generate aggregated data (group-level statistics) from CDR for efficient disaster response, among other applications. FlowKit is an open source suite of software tools that enable secure access and analysis of de-identified mobile network subscribers’ mobility patterns and network usage. It aims to overcome a key challenge for MNOs interested in engaging with humanitarian actors: providing them with secure and privacy-conscious access to sensitive customer data. Analytics generated from this data can help governments and humanitarian organisations understand where best to target relief efforts immediately after a crisis.

As part of the software toolkit development, two partner MNOs (Digicel Haiti and Vodafone Ghana) were provided with the open source code needed to set up a system for monitoring population flows, and installed this in their data centres behind their firewall.

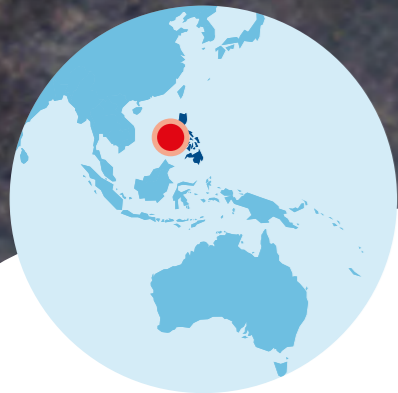
The pilot also demonstrated that FlowKit could be implemented easily and independently from Flowminder. The Digicel Haiti team were able to download and install the software unaided, and reported that they found it to be “easy and straightforward”.

“One of the key challenges during an emergency is getting help to those who need it the most as efficiently as possible. The issue is timely access to accurate information about the movements of people, particularly after a natural disaster, so we waste a lot of time and money trying to get food, shelter and other assistance to those who need it. A tool like FlowKit could really change things. This could save lives, not just time and money.”

Christine Latif, World Vision⁶

When FlowKit is installed on an operator’s system, it could take three to four days from the onset of a crisis to provide useful data to humanitarian responders, a notable reduction from the average 11 days. For example, in the early stage of the COVID-19, Flowminder, in partnership with Ghana Statistical Service and Vodafone Ghana, released initial insights on the effect of mobility restrictions within four days of the request. The preliminary analysis provided in this report was completed very quickly, providing responders with timely, high-level insights into a fast-changing situation. FlowKit has also been installed at MTC Namibia where it was used to provide the Government with mobility statistics for their response against COVID-19, and in Vodacom DRC where it supported CDR analysis to optimise vaccination interventions as part of Flowminder’s work on the [GRID3 Mapping for Health](#) project.

⁶ Flowminder. 2019. [FlowKit: Unlocking the power of mobile data for humanitarian and development purposes.](#)



NOKIA

Nokia

PROJECT:	Nokia Saving Lives (NSL)
SUMMARY:	Networked drones used to support and improve the Philippine Red Cross response to rapid onset disasters by providing access to connectivity and data streaming of search and rescue analytics.
TECHNOLOGY:	Unmanned aerial vehicles (UAVs)/drones and LTE connectivity
BUSINESS MODEL:	Donor funding
COUNTRY:	Philippines
GRANT PERIOD:	June 2018 to January 2020

Nokia Saving Lives (NSL) is a corporate non-profit initiative providing innovative communications technology in disaster response. NSL received a GSMA grant to work with the Philippine Red Cross and Smart Communications (a local MNO) to embed the technical solution in the local emergency response portfolio.

Using UAVs and real-time applications like video streaming, onboard sensors, mapping and analytics, NSL helps first responder teams to rapidly gain situational awareness to provide the fastest possible response with a much broader set of information. Mobile broadband connectivity is provided by Nokia wireless technology with a local operator to establish a secure and reliable network at emergency response location.

During the grant period, NSL formalised relationships with both partners so that in the event of a disaster, Smart would be able to provide spectrum access to the system. This will allow Philippine Red Cross and Nokia volunteers to use the UAVs and collect assessment data. The UAVs and equipment used by responders are connected through a private wireless network, which enables reliable on-site communication, centralised data collection (for on-site AI processing), and access to a broader range of information to determine relevant response data (such as the number of required personnel or impacted people, or identifying necessary equipment).

The pilot proved successful, with demonstrations and live rehearsals showing that emergency response teams could assess multiple sites from one remote hub. This will lead to a notable reduction in the time it takes to collect and analyse vital data for the broader response effort. The system was in operation three times during the grant period, with over 10,000 individuals indirectly impacted by these efforts.

Following the Porac earthquake in 2019, infrastructure was assessed by the NSL solution together with the Philippine Red Cross team to improve awareness of structural damages. The NSL solution was used in a preventive manner to assess potentially unseen damage around a collapsed supermarket area. Data was also collected that could be useful for future planning and rebuilding. This live deployment demonstrated the value of the system to both the Red Cross and the local municipality.

“This project underlines our commitment to use Nokia technology for good in collaboration with our partners and existing ecosystems. Furthermore, we have proven, that private wireless and UAV technology in collaboration with first responders can improve the efficiency and ease efforts in the field, when every second counts. Whenever there is a tiny little chance of mitigating risks for people or saving lives, every engineering effort is worth it”

Thomas Eder, Senior Engineering Manager, Nokia

“This drone and network solution can help us gather accurate and up-to-date data on the status of lifelines in disaster situations. This in turn can provide us with information vital in the implementation of rescue and assistance to the affected areas.”

Elizabeth Zavalla, Secretary General of the Philippine Red Cross

Following successful completion of the grant project, Nokia has incorporated the solution into their commercial private wireless offerings for clients undertaking demanding search and rescue activities. The technology underpinning the solution is now being used around the world, in disaster resilience contexts as part of the Sendai City Tsunami Warning System in Japan, Fire Departments in Belgium as well as in infrastructure, utilities and public safety projects, including New York Power Authority and more.⁷

⁷ [Nokia Drone Networks](#)



Seven lessons from the Innovation Fund portfolio

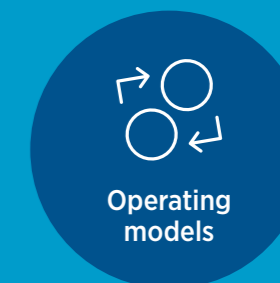
Using the vast body of evidence generated by these five mobile-enabled innovations, seven overarching lessons were identified. These lessons can help inform how other innovators might consider implementing early-stage innovations that leverage the power of mobile technology to build resilience. These lessons fall under three broad interconnected themes:



Users and context



Partnerships



Operating models



Users and context

Lesson #1

Innovators need to build trust with end users, either through face-to-face engagement or known entities

Building trust in a new technology is critical for uptake and, later, for scaling and replication. While this process can be time and human-resource intensive, building trust is an essential step in implementing mobile-enabled innovations. If violated, trust can be quickly lost and difficult to recover. This process is even more important when working with marginalised communities who may have experienced exploitation in the past. The grants in the Innovation Fund portfolio used a variety of tactics that were successful in building trust. **Two key lessons were that trust can be built through face-to-face engagement and through known and accepted entities.**

Face-to-face engagement

In many cases, user-facing mobile-enabled innovations are introduced most effectively when they are complemented with face-to-face user engagement. These interactions can help build trust in a new technology or intervention because representatives can explain the value of it clearly and in person. It is essential that users both understand and value the technology, service or product, and this requires investment in awareness raising and sensitisation. This is especially true when targeting marginalised groups or populations that may be more difficult to reach through strictly digital channels.

In Haiti, the majority of **Mercy Corps'** CHANTER users were engaged in person through work with community-based organisations, sensitisation workshops and through local leaders. Although it took significant time and resources, this outreach was identified in an evaluation as one of the main reasons why CHANTER was so well received.

Participants felt in-person engagement helped them familiarise themselves with the new topic of disaster preparedness, and helped them to understand the importance of community collaboration to build resilience.

“Due to the sensitisation, I know more about cyclones, how to be prepared.”

CHANTER service user

Likewise, **Lumkani's** model, which also relied on face-to-face interaction at prospective users' homes, was successful in engaging marginalised and vulnerable groups. By going door-to-door, Lumkani representatives were able to include persons with disabilities. During the COVID-19 pandemic, humanitarian organisations found it particularly challenging to provide face-to-face services, which can make it more difficult to reach and build trust among marginalised communities.⁸

Known entities

Another way that projects in the Innovation Fund portfolio built trust was by working with known entities. Organisations or individuals that already have relationships with target audiences can develop new community relationships more quickly. For example, both **Lumkani** and **Mercy Corps** worked with trusted contacts from target communities. While Lumkani hired agents from within the communities where they were rolling out the service, Mercy Corps worked alongside over 20 community-based organisations that had established relationships in the areas they were targeting. Mercy Corps also involved eventual project users in programming design before activities were officially rolled out, which increased a sense of ownership within the communities.⁹

Referrals were another way that existing relationships were leveraged to build trust with

communities. Lumkani introduced customer referrals, which led to a significant increase in the uptake of micro-insurance. Similarly, **REFUNITE** found that users were more willing to try LevelApp when it was recommended by someone they knew.

Finally, working with entities that had positive reputations in target communities was another way to build trust. In Haiti, Mercy Corps found that coordinating, even minimally, with the Haitian Civil Protection Agency helped gain community trust in the system. Likewise, Lumkani built trust in their products by partnering with the well-known and locally trusted brand, Hollard Insurance.

Building initial trust and buy-in with end users is critical to the success of a new product or service. While this can often be a labour- and resource-intensive process, it can have an invaluable impact on building resilience.

⁸ GSMA. (2021). [COVID-19 and Digital Humanitarian Action: Trends, Risks and the Path Forward](#).

⁹ The M4H team has developed a human-centred design toolkit for humanitarian and technology organisations to use in the development, iteration and testing of their own digital humanitarian products and services. See: GSMA. (2020). [Human-Centred Design in Humanitarian Settings: Methodologies for Inclusivity](#).

Lesson #2

Innovators need to ensure they truly understand the local context, including prospective service users

Before designing a mobile-enabled product or service, it is vital to understand the people and place one is designing for. This is true generally, for any new digital intervention, as well as for specific mobile-enabled solutions that require a deep understanding of local risks and how best to address them. To design for local contexts and service users, innovators must conduct thorough initial research and continue to learn through iterative testing at all stages of innovation.

Regulatory environment

Innovation pilots that use mobile technology are more likely to be successful when the policy and regulatory environment supports the service, or at least does not restrict it. These considerations are even more important for mobile-enabled services, which are often subject to heightened regulatory requirements from government or regulatory agencies, including in areas such as communications, finance and technology.

There is a significant number of restrictive regulation globally on the use of big data. **Flowminder**, which relies on the use of big data and MNO data, implements their projects in line with national regulations, the EU's GDPR regulations and MNOs' own restrictions.

The experience of **Nokia**, however, suggests that for larger, internationally recognised organisations,

piloting innovations in a difficult regulatory environment might prove beneficial in terms of the lessons learned and the ability to adapt the model to more markets. The Nokia Saving Lives team faced many regulatory hurdles in the Philippines, such as a cumbersome import and export process for their hardware, a strong and competitive regulatory environment for the use of spectrum by drones and a constantly shifting regulatory environment for the day-to-day use of drones. By addressing these challenges, they are arguably in a stronger position to deploy their solution in other markets (with equally or less restrictive regulatory environments).

Whether innovators choose a lower barrier to entry or choose to tackle more challenging regulatory environments, it is important to understand local policy and regulations before implementation begins.

Box 1

Advocating for policy change

If a "critical mass" of projects leverage a certain technology or approach, implementers may be able to successfully advocate for policy change to make regulatory environments more favourable. While policymakers often view humanitarian use cases as compelling, securing change is often time and labour intensive. Advocacy efforts are more likely to be successful when they are delivered by coalitions of organisations that can invest time and resources in making the case for a specific issue, often repeatedly. These efforts also deepen relationships and a sense of mutual ownership of the outcomes. For example, a coalition of UNHCR, local MNOs and the GSMA worked together over many months to encourage the Ugandan Government to make SIM registration widely available to refugees, which ultimately led to over 600,000 people being able to access mobile services in their own name for the first time in the country.¹⁰

Connectivity access

It is essential that mobile-enabled innovations consider the local connectivity infrastructure, both physical (such as 2G/3G/4G coverage) and human (such as agent networks). This information is vital in understanding what technologies and operational models are feasible in a given mobile ecosystem. It is common for innovations to encounter barriers to access and service uptake (this was highlighted in evaluations for both **Mercy Corps** and **REFUNITE**). One way to access this information is through a local MNO, as Mercy Corps and Nokia did. In each case this ensured that the MNO could be part of relevant planning and implementation discussions, and provide confirmation first-hand whether their networks could support the proposed activities.

In addition to network infrastructure, it is important to understand what technology is accessible to and used by target users. It is essential that the practicality of the technology, service or product in the humanitarian context is tested in preliminary

stages, and that exploratory studies shed light on how to tailor the product and distribution approach. These studies should cover a number of areas, not only whether an innovation can technically be deployed in a given context, but also an understanding of how people are using technology in practice. To gain a nuanced understanding of this information, it is important to consider aspects such as the digital literacy of prospective users, what mobile devices people already own and whether the community has reliable access to energy to charge them. Mercy Corps used preliminary studies to assess community access to connectivity and gauge the technical feasibility of their service. REFUNITE ensured they understood smartphone penetration in their target geographies to determine which segments of the community would be able to access the service.

¹⁰ GSMA. (2020). [Proportionate Regulation in Uganda: A Gateway for Refugees Accessing Mobile Services in Their Own Name](#).

User needs and preferences

Grantees also highlighted the importance of understanding user needs and preferences from the start. Only by understanding user needs, (digital) literacy levels and the daily reality of people's lives can programmes be designed effectively to reach users and ensure uptake and sustained usage.

Mercy Corps, for example, conducted baseline studies on gender dynamics,¹¹ locally relevant climate risks and information and communication landscapes. They found that low literacy and high prevalence of feature phones meant that IVR technology could best reach their audiences. Using human-centred design methodologies, the team co-created 13 audio scripts in Creole, the predominant language spoken in Haiti. They also conducted research to understand what time of day users would prefer to receive calls. By working around users' schedules, they saw an 18 per cent increase in users who listened to over 75 per cent of messages.

It is also important to understand the services (formal or otherwise) that potential users already rely on to meet their needs. For example, **Lumkani** knew that residents of informal settlements often had to take informal loans from loan sharks to recover from fires, which put them in precarious financial situations. Understanding this dynamic helped them position their micro-insurance product in a way that could help people avoid this in future and support them in becoming more financially resilient.

It is important to recognise that contextual and user research should be an ongoing process throughout the life cycle of a programme. This includes not only the piloting and implementation phases, but also when the project scales and is replicated in a new context. When expanding to a new market, programmes need to adapt their design to fit the local context. Differences in technological landscape, regulations, cultures and norms all need to be taken into account.

Box 2

Measuring access, use and interest in mobile

It is essential that innovators proactively gather evidence to demonstrate that users are able and willing to access and use any mobile technologies leveraged by a project. To support this process, the GSMA worked with REACH and the Emergency Telecommunications Cluster (ETC) to develop the Connectivity Needs and Usage Assessment (CoNUA).¹² CoNUA provides tools to understand users' mobile phone access, usage, preferences and digital skills in a robust and standardised manner. This evidence is valuable for organisations providing a range of products and services in diverse humanitarian contexts, and many of the tools can be tailored to address specific evidence needs.

Lesson #3

Equitable access is a key consideration in mobile-enabled innovations

Many donors are increasingly concerned about the ethics of innovation. Research has indicated that a lack of ethical frameworks or principles for humanitarian innovation, combined with the inclusion of new actors and new forms of experimentation in humanitarian settings, risks exacerbating conflict, challenging local power dynamics and introducing cultural sensitivities.¹³ These considerations will likely become more pressing in the coming years as more humanitarian aid is digitised and humanitarian actors pay closer attention to the ethical implications of new technologies.

Disaster does not affect all groups equally. The most marginalised groups in society are likely to be more negatively impacted and the most likely to be excluded from preparedness and resilience planning. It is therefore essential that digital solutions do not exacerbate this situation for marginalised and vulnerable groups, such as women, older people or persons with disabilities. Distribution and delivery channels need to consider, among other issues, gender norms and patterns of inequality.

Before launching, humanitarian innovation projects must ensure that the technical design will not exclude any marginalised groups. Creating an intentional inclusion strategy can help inform technology design choices to reach more

marginalised audiences. For example, having a plan to engage women can help ensure they are included. **Lumkani** achieved this by placing a strong emphasis on hiring female agents, and today 80 per cent of their agents and two-thirds of their customers are women. Likewise, **Mercy Corps** advertised their service in public areas they knew women frequented and engaged two women's groups and one mixed-gender group to help them reach women. As a result, they saw a 28 per cent increase in women accessing information services through the CHANTER platform compared with their original target.

¹¹ More information on the importance of understanding local gender norms can be found in Lesson 3.

¹² GSMA. (2020). [Connectivity Needs and Usage Assessment](#).

¹³ Betts, A. and Bloom, L. (November 2014). "Humanitarian Innovation: The State of the Art". OCHA Policy and Study Series 009. OCHA PDSB.

Throughout programme implementation, it is important to look beyond download numbers to understand how products and services are being used and who is using them. For example, are women able to access the service at the same rate as men? This type of monitoring can help ensure that all user groups can access the innovation in practice. In Haiti, monitoring identified specific gendered barriers related to women's mobile usage, which prompted Mercy Corps to deliver gender training to its stakeholders to mitigate the risk of exclusion. They also integrated sensitisation activities and face-to-face interaction with prospective users to ensure that their messages reached even those who did not have access to mobile phones. Likewise,

the **REFUNITE** project in Uganda faced challenges reaching women. They found that men, especially in Kiryandongo, tended to recommend LevelApp to their male rather than female counterparts. This was due not only to social norms for interaction between men and women, but also the fact that LevelApp was viewed by many as an income-generating opportunity and better suited for men, due to patriarchal assumptions and expectations.

These types of dynamics need to be considered to ensure equitable access to digital humanitarian innovations and reduce the risk of exacerbating existing inequalities.



Partnerships

Lesson #4

Successful mobile-enabled innovations often require the buy-in of multiple stakeholders whose expectations are aligned

Due to the unique nature of mobile humanitarian innovations, they require input from multiple stakeholders by design. To create a successful partnership, the motivations of these stakeholders must be aligned.

MNOs

In a crisis, mobile networks are vital to facilitating access to information, coordinating assistance and providing connectivity (both to enable digital humanitarian services and ensure affected communities stay connected). Most mobile-enabled innovations therefore necessitate, or benefit from, the active involvement of a local MNO, as was the case for **Mercy Corps, Nokia** and **Flowminder**.

Developing successful partnerships can be challenging. Organisations that want to engage with MNOs should take the time to develop a value proposition for the relationship, evaluating not only their own "haves" and "needs", but also those of the MNO.¹⁴ Successful partnerships are, at their foundation, beneficial to both partners. They

leverage the subject matter expertise, content and service aims of the humanitarian sector, and pair it with the core communication competency, infrastructure and scale of MNOs. Flowminder had to first work to build the trust of their partner MNOs (Digicel Haiti and Vodafone Ghana) in the FlowKit system from a technical and data privacy perspective, in order to build a compelling case for uptake and engagement in the humanitarian use case, and lay the groundwork for MNOs to use the system for core services in the future.

¹⁴ This GSMA Ecosystem Accelerator report, while focused on start-ups, provides a good model for assessing "haves" and "needs": GSMA. (2017). [Building Synergies: How Mobile Operators and Start-ups Can Partner for Impact in Emerging Markets](#).

To create meaningful and on-going engagement, it is advisable to find opportunities for MNOs to engage in ways that go beyond a corporate social responsibility (CSR) initiative. Identifying areas of commercial value early in the process can help ensure the long-term viability and sustainability of the partnership and set it up for success.¹⁵ For example, the integration of Mercy Corps' CHANTER service in fee-generating services (such as Viamo's 3-2-1 service) in Haiti will generate income for Digicel. Additionally, the current free IVR service

has arguably extended the reach and reputation of the operator in target communities. Likewise, the Nokia team produced joint marketing with Smart Communications in the Philippines, helping to build the reputation of the organisation.

Grantees found that, in addition to the value proposition, investing resources in building and maintaining relationships was extremely important in ensuring a productive, on-going partnership with MNOs.

Box 3

The Humanitarian Connectivity Charter¹⁶

In 2015, the GSMA launched the Humanitarian Connectivity Charter (HCC), an industry initiative to support MNOs in improving access to communication and information for those affected by crisis to reduce loss of life and make a positive contribution to humanitarian responses. The HCC sets out principles for both the mobile industry and humanitarian sector to work together in partnership to support the provision of connectivity and access to information to support humanitarian response activity. To date, the HCC has been signed by 159 MNOs operating in 111 countries.

Humanitarian and government stakeholders

Buy-in from humanitarian and, in many cases, government stakeholders, is essential for an innovation to succeed. In addition to strengthening the innovative capacity of an economy through relaxed policies or increased incentives to innovate, certain technologies or approaches that build resilience require specific authorisation from governments, such as the use of unmanned aerial vehicles (UAVs) by the **Nokia** team, or sending bulk messages by **Mercy Corps** in Haiti. Although time consuming, this can have additional benefits. Mercy Corps and **Flowminder** both found that coordination with government authorities was an effective way to get buy-in from other stakeholders and potential service users at both the organisational level (for Flowminder) and the community level (for Mercy Corps users).

Innovators may also seek buy-in from established actors to integrate their solution in existing resilience and recovery networks, avoiding duplication. This

was the case for Nokia, which chose to develop their service as a tool to be deployed by local Red Cross teams rather than creating an independently operated "corporate good" effort.

However, building traction for new ideas with these stakeholders can be difficult. Not only must decision makers see the problem as critical and the affected constituency as a priority, but they must also believe that existing analogue approaches are inadequate and that a digital or mobile-enabled solution is likely to improve the situation. Gaining acceptance with these stakeholders can be particularly hard when solutions introduce new technologies or fall outside existing ways of working. However, a number of grantees successfully overcame this through meaningful coordination and transparent engagement.

Box 4

The value of mobile-enabled programming for building resilience

In Haiti, Mercy Corps' CHANTER project demonstrated that mobile technology is a cost-effective way to inform communities, even in remote areas and regardless of gender, about extreme weather events, and to provide advice on what to do to prepare for and minimise impact. Likewise, Lumkani demonstrated that their mobile solution could not only reduce the spread of fires in informal settlements, saving lives and property, but also provide livelihood protection and greater financial resilience in the form of micro-insurance, possibly for the first time given the ability of the IoT device to geolocate policyholders. As the sector continues to focus on activities that build resilience, other innovators should consider how to position their mobile-enabled resilience programmes with key stakeholders. Demonstrating efficacy, equity and cost-effectiveness is likely to be a key selling point for potential humanitarian, MNO and government partners considering mobile-enabled interventions.

Lesson #5

Partnerships are successful and sustainable when they capitalise on their unique competencies

Once innovators have successfully engaged partners for the delivery of a mobile-enabled innovation, the structure and quality of these relationships often determines whether the innovation will be successful, sustainable and scalable.

Innovators should consider the unique competencies of their partners, especially when partnering with organisations from new sectors. A solid understanding of the capacity, limitations, expectations and interests of each partner is a cornerstone of any partnership, but especially when the parties may have diverse motivations and ways of working, as is often the case with partnerships between humanitarian organisations and MNOs.¹⁷

For example, when **Lumkani** partnered with Hollard Insurance, they not only added a respected local brand to their service offering, but also one that plans to sell Lumkani fire cover in their stores across South Africa, marketing it to high-value clients who could purchase it for their employees, and greatly expanding the product's reach. **Mercy Corps** partnered with Viamo, which provided a unique technology service integrated with local MNO Digicel, enabling the CHANTER system to

benefit from both Digicel Haiti's extensive network coverage, and the impact of Viamo's proprietary communication system.

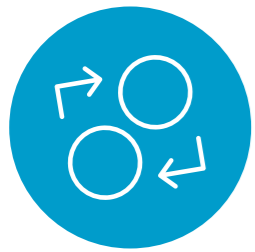
Mobile-enabled services often involve a broader range of stakeholders than analogue programming and, in an innovation context, it is likely that organisations will be working with new sectors for the first time. Echoing the findings of earlier GSMA research,¹⁸ it is essential to ensure that the roles and responsibilities of all partners are clear from the start of any innovation project. This should include the establishment of strong communication and collaboration mechanisms. It is also important to ensure that relationships with technology partners, including MNOs, are not solely transactional based on service provision, but are strong partnerships with active involvement of colleagues from all organisations.

¹⁵ GSMA research has identified four key areas in which supporting humanitarian services can add value to MNO operations: revenue, competition, reputation and influence. See: GSMA. (2020). [Partnering During Crisis: The Shared Value of Partnerships between Mobile Network Operators and Humanitarian Organisations](#).

¹⁶ GSMA. (2015). [GSMA Humanitarian Connectivity Charter](#).

¹⁷ GSMA. (2015). [Partnership Guidelines: Building Effective Relationships between MNOs and NGOs in Complex Environments and Crises](#).

¹⁸ GSMA. (2019). [Navigating the Shift to Digital Humanitarian Assistance: Lessons from the International Rescue Committee's Experience](#); GSMA. (2020). [Partnering During Crisis](#).



Operating models

Lesson #6

Innovators need to carefully consider who will ultimately pay for their mobile-enabled innovation

A key part of ensuring mobile-enabled humanitarian innovation is financially sustainable is considering who will pay for the service. Three main models were evident in the Innovation Fund portfolio:

Service users

Lumkani adopted a partial business-to-consumer (B2C) model whereby service users paid for the micro-insurance element of their solution. This highlighted the importance of affordability when considering how to create a sustainable service. Adopting a low price point to extend the reach of the service will require comparatively more users to become profitable. Pricing the service higher will reduce the required number of service users, but also exclude lower income groups.

It should be noted that even when users are willing to pay for a product or service, it still might need to be subsidised by other revenue streams to include more marginalised groups. This is especially critical

when delivering programming to build resilience. For Lumkani, the GSMA grant paid for the installation of fire sensors in all households, ensuring that even the most marginalised were covered.

Lumkani's micro-insurance product demonstrated the importance of proving the value of a service to end users if organisations expect them to pay for it. Many Lumkani users found the concept of insurance difficult, as they were expected to pay for something they hope they will never use or see the value of. It requires proactive education and sensitisation to shift mindsets and encourage users to invest in their own resilience.

Organisations (partners or clients)

Seeking partner organisations (private or humanitarian sector) committed to funding innovations is important, especially as innovators approach the end of their grant funding. The **REFUNITE** model requires businesses, as paying customers, to pay for their micro-tasking services, otherwise they would not be able to continue providing supplementary income to refugees and the communities who host them. The Nokia Saving Lives solution, meanwhile, must operate as a pay-

for-service that humanitarian organisations invest in if it is to scale and replicate (or otherwise be donor funded).

The Innovation Fund portfolio includes a successful implementation of this model. While Mercy Corps' CHANTER service in Haiti is donor funded, using elements of the donor funding to pay for Viamo's IVR service demonstrates that humanitarian organisations are willing to pay to mainstream efficient innovative technology.

Donors

Where there is not a paying user of a mobile innovation, it will most likely need to be financed through sustained investment from donors or the public sector. There is evidence from the grantees that donors are willing to pay for or subsidise services with proven value. Since the GSMA grant

ended, Mercy Corps has raised over £5 million from multiple donors to fund five new projects using the model proven by CHANTER. Meanwhile, Lumkani won the European Commission Prize for Affordable Humanitarian Tech for their solution, which came with an additional €1 million (£860,000) in funding.

Lesson #7

Mobile technology introduces unique scale and sustainability considerations that innovators need to address

Innovations that use mobile technology to deliver humanitarian services have unique barriers and enablers to becoming sustainable and reaching scale. The GSMA Innovation Fund portfolio features several novel factors that other innovators should take into account:

- All five of the grant projects demonstrated that innovator teams need to include people with specific technical skills. In addition to the financial, management, logistical, community mobilisation and other skills that most humanitarian innovators need, teams also need mobile-specific skills, such as coding knowledge or an understanding of how to integrate services with MNOs. However, this can

present challenges. For example, during the grant period, **Lumkani** found it difficult to hire software developers as there was high market demand for their skills in South Africa. Their experience showed that it can be a challenge for innovations in the humanitarian space to attract and afford the technical skills they require given that these skills are well compensated in the private sector.

- The **Flowminder** FlowKit development demonstrated that designing and building solutions using MNO data and servers is extremely important to scaling and replicating. It became clear that solutions built on infrastructure tailored to a specific MNO restricts so-called “plug and play” solutions. Meanwhile, technical solutions built on common or open source specifications are easier to deploy, especially if MNOs are able to download and install them directly with little to no support from the original innovators.
- The **Flowminder** solution also highlighted that digital innovations that create software or platforms often have high upfront costs in the launch and testing phases. To maximise sustainability and the potential to scale and replicate, these innovations should be designed to be cost-effective as they grow. Services relying on software that requires regular maintenance and updates might need a sustained funding source.
- Innovations that use agent models to on-board users and provide on-going customer service (common with mobile-enabled services and implemented by the **Lumkani** team in their pilot) face unique limitations in terms of scale and replication. The model requires upfront costs, has slow initial sales growth and, ultimately, limited reach and uptake in a given area. To be financially sustainable, the innovation would need either significant capital to build an agent network across a wide geographical area or to reduce the number of touch points (while maintaining the trust-building aspects of the agent model).
- Identifying and registering new users can present several unique challenges for mobile-enabled innovations. For example, user bases can grow too quickly. **REFUNITE** found that making LevelApp available on public application stores increased demand much more than they could sustain during their pilot, leaving them with a waiting list of many thousands (they ended up removing the app from stores until demand could be sufficiently met). Alternatively, registering users on the system can be a time-consuming process and difficult to do at scale, such as when **Mercy Corps** found that collecting users’ phone numbers was a barrier to effective roll out and needed to work with local community-based organisations to receive assistance.



Conclusion

Mobile is a lifeline for those affected by sudden-onset disasters and protracted humanitarian crises, and it has an important and growing role to play in building resilience to crises of all kinds. This has been demonstrated in the lessons from the GSMA Mobile for Humanitarian Innovation’s inaugural round of grant funding, which illustrate a range of solutions, technologies, strategies and operating models.

As these mobile-enabled innovations continue to generate new lessons, develop and scale, more evidence and insights are sure to emerge that will help actors deploy technologies in appropriate, equitable and impactful ways. The scaling journeys of these innovations are well underway; three grantees are already active in or exploring new contexts for deployment, which will yield new challenges and lessons. Three grantees have also secured additional donor funding, indicating that a “crowding in” of new funders is already helping to make these services available to many more service users.

In addition to the five projects selected for funding in the inaugural round of the GSMA Mobile for Humanitarian Innovation Fund, there is a wealth of other mobile-enabled products and services focused on building resilience. The collective lessons of these interventions will enable progress towards more resilient communities.

The M4H team will continue to monitor and share lessons and insights from these five innovations, as well as those from the full Innovation Fund portfolio (22 projects in total)¹⁹ and partnerships between MNOs and humanitarian organisations that the team supports outside the Fund (19 projects in total).²⁰ Together, these solutions and partners will help ensure that mobile is used as effectively as possible to accelerate the delivery and impact of humanitarian assistance.

¹⁹ All the grant projects can be found on the [M4H Innovation Fund Grantee Map](#).

²⁰ An upcoming report will focus on the lessons of these strategic partnership projects.

Appendix: Methodology

To identify key lessons learned across the portfolio of grantees, the GSMA commissioned Triple Line Consulting to conduct a systematic review of over 110 pieces of evidence generated. This Appendix lays out the methodology for this synthesis work, which was developed and agreed between Triple Line and the GSMA when the work began, and adapted as necessary during implementation. The work was delivered in four stages:

Stage 1: Synthesis phase

The content of 110 project and fund-level documents were analysed to identify evidence and lessons relevant to the agreed learning questions and sub-questions. To maintain focus on relevance and higher-level learning likely to have wider application, double- and triple-loop learning related to mobile technology were prioritised. This focused on learning about the approach (“Are we doing the right things?”) and context (“Are we doing the right thing in this context?”) while also capturing single-loop learning (“Are we implementing well?”).

Relevant data was reviewed and tagged by learning question so that it could be entered into a data analysis sheet, noting which project it came from and the data source. Once grouped, data was analysed further to identify the main lessons under each learning question, each of which was supported by detailed lessons. Each lesson was therefore supported by evidence extracted from various project documents.

Taking this analysis, each detailed lesson was entered into a “lessons log” Excel sheet, under its main lesson (which was tagged, for example, as “inclusion” or “cost-effectiveness”) and clearly indicating which learning question it related to. Each detailed lesson was analysed using a protocol developed for the purpose, and recorded in the lessons log.

Stage 2: Interpretation Phase

The collated and analysed data was subject to further rounds of interpretation to test its accuracy, completeness and consistency and enable refinement through:

- An Internal Review workshop by the team to review, discuss and refine emerging findings and double check consistency in how the protocols had been applied; and
- Review and quality assurance by innovation and digital experts.

Stage 3: Reflection phase

The analysis was then explored through reflection sessions and in-depth interviews with GSMA team members and grantees, which were conducted to share the analysis, test its robustness, invite comment and probe for further evidence or explanation. Insights and further evidence resulting from these sessions was applied to make further refinements to the lessons log.

Finally, a validation workshop with the entire GSMA team was used to present and explain the structure of the lessons log as a whole and, importantly, to discuss the lessons that had emerged from the systematic review to inform a final round of refinements.

Stage 4: Refinement phase

Once the lessons log was finalised, the GSMA team used it to categorise the identified lessons within an overarching framework. This framework was then used as the overarching structure for the development of this report.

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