# OPERATIONAL AND DELIVERY NETWORKS:

## How They Work and How to Build One to Solve Global Problems

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**Operational and Delivery Networks are breaking down the organizational and disciplinary silos that have** hampered effectiveness in the past and leveraging technology to deliver high-impact programs and services at scale. This report provides an analysis of three such Operational and Delivery Networks: the collaboration of the Red Cross and the OpenStreetMap platform, the operational use of UNICEF's RapidSMS platform, and the Gates Foundation's Global Libraries program and its mission to deliver Internet access via public libraries around the globe.

GLOBAL SOLUTION NETWORKS

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# Idea in Brief

It wasn't long ago that international development and service delivery companies, governments, NGOs and foundations did their work in isolation and treated their data, expertise and resources as proprietary assets that needed to be protected from other people and groups working on similar goals. Today, emerging global solution networks are making it possible for the skills, knowledge, assets and capabilities of states, corporations, foundations, NGOs and individuals to be brought together to overcome what have been some of the world's most intractable operational challenges. From climate change to corruption, poverty to a lack of adequate health care in developing countries, these so-called Operational and Delivery Networks are breaking down the organizational and disciplinary silos that have hampered effectiveness in the past and leveraging technology to deliver high-impact programs and services at scale.

This report provides an analysis of three such Operational and Delivery Networks: the collaboration of the Red Cross and the OpenStreetMap platform; the operational use of UNICEF's RapidSMS platform; and the Gates Foundation's Global Libraries program and its mission to deliver Internet access via public libraries around the globe. The case studies highlight the importance of sharing existing assets more broadly; of recognizing that innovation does not always require a large operational budget; and of understanding that Operational and Delivery Networks are not immune to volatile political environments, which can limit their ability to scale.

# Operational and Delivery Networks

A global solution network is a group of independent entities (e.g. a government, a company, a foundation or individual citizens) united around a global problem that none can solve alone.[1] While some networks gather and disseminate knowledge, others work on policy creation, advocacy or oversight. Operational and Delivery Networks are distinguished from the other nine types of global solution networks in our taxonomy[2] by the fact that they actually deliver the change they seek.

Operational and Delivery Networks improve on the old model of service delivery, which had companies, governments, NGOs and foundations working in isolation from each other, and in which data, expertise, relationships and resources are perceived as assets that should be protected from other people and groups working on similar goals. These new networks combine the skills, knowledge, assets and capabilities of states, corporations, foundations, NGOs and individual citizens to devise and implement

effective solutions to major challenges such as climate change, corruption, poverty or the lack of adequate health care in developing countries.

This report is an analysis of three Operational and Delivery Networks that are harnessing innovative tools and technologies to solve some of the biggest operational problems on the planet. The Red Cross/ OpenStreetMap collaboration demonstrates how a traditional emergency relief NGO, when teamed with an army of dedicated digital volunteers, was able to provide detailed operational maps to disaster workers assisting victims of Typhoon Yolanda (known as Haiyan in the West) in the Philippines in late 2013. The RapidSMS Network demonstrates how a major UN agency is utilizing mobile telephony to collect and analyze real-time data feedback from stakeholder groups—feedback that informs UNICEF and its partners about local development needs, and helps them assess the impact of their development programs.

Finally, the Global Libraries program shows how a major philanthropic player—the Bill and Melinda Gates Foundation—took a US-based program that was designed to close the digital divide and scaled it into a global solution. The case explores how the foundation is collaborating with its private sector and government partners to transform public libraries into a global network of community-based hubs for online connectivity, training and personal development.

All three networks have leveraged technology to share and coordinate knowledge, engender partnerships with diverse stakeholder groups and implement programs and services that are improving the world and changing people's lives for the better. While the realm of endeavor may differ, successful Operational and Delivery networks such as these share several common attributes. Broadly speaking, Operational and Delivery Networks:

- Facilitate partnerships across institutions, sectors, regions and/or disciplines in order to deliver high-impact programs and services at scale.

- Foster a culture of openness and collaboration in development of programs and services where diverse stakeholders provide complementary assets and skills.

- Leverage self-organization in their organizing dynamics wherein participants self-select for tasks in the network, but communicate and share resources in a coordinated way.

- Use technology and social media to collaborate, share and access data, ideas and knowledge.

- Enable a culture of reflection on best practices and continuous improvement in the programs and services they deliver.

Although the Operational and Delivery Networks featured in this report were initiated by traditional NGOs, foundations or UN agencies, the

influence of these networks now transcends the political and organizational boundaries of their origins. The case studies highlight the importance of sharing existing assets more broadly, enabling innovation even without the benefit of a large operational budget. They also illustrate that Operational and Delivery Networks can be restricted in volatile political environments, which can limit their ability to scale. Perhaps most important, the operational similarities of these networks demonstrate that the principles guiding them can be applied to new networks that have similarly ambitious goals.

# Case Study 1:
# The Red Cross/OpenStreetMap Collaboration

When a humanitarian disaster strikes anywhere in the world, the ability to deliver timely relief to victims depends on reliable, real-time information about the type of assistance required and the specific location where it is needed. Experts within the humanitarian community report, however, that in the chaos of a major disaster there is often a profound lack of reliable current information or dependable, up-to-date maps—that is, detailed, data-driven, mapping information about a region both before and after a crisis hits; maps that can assist relief workers to prioritize the delivery of aid to those areas most affected, including areas that may have had no reliable up-to-date maps prior to the crisis.

Several multi-stakeholder initiatives have tried to address this problem and many of them play complementary roles in assisting emergency response teams in disaster situations through the Digital Humanitarian Network, a network of volunteer and technical communities that collaborates with humanitarian organizations in disaster situations. The Standby Task Force, for instance, trains and organizes digital volunteers who support international responders operating in crisis situations by providing crowdsourcing, mapping, data scrambling and technology testing.[3] GISCorps provides volunteer geographic information systems (GIS) services in both capacity-building and post-disaster humanitarian settings worldwide. The subject of this case—OpenStreetMap—is a large-scale collaborative mapping project in which over one million online volunteers create and distribute open source maps of the world that provide an essential platform for humanitarian relief efforts, along with many other applications.

OpenStreetMap is like a Wikipedia for cartographers. The online platform is free to use, and anyone can add or edit mapping data without any technical or legal restrictions.[4] In humanitarian crises, the Humanitarian OpenStreetMap Team—also known as HOT—acts as a bridge between traditional humanitarian responders and the OpenStreetMap community,

working both remotely and on location at disaster sites to assist with the collection, delivery and application of OpenStreetMap data.[5] In 2013 the OpenStreetMap community, led by its HOT branch, collaborated with the Red Cross—the largest humanitarian entity in the world—to support relief efforts for the victims of Typhoon Yolanda/Haiyan. Looking at how the Red Cross/OpenStreetMap Operational and Delivery Network addressed the mapping gap during the typhoon disaster provides insight into how humanitarian NGOs, technology leaders and volunteer networks can join forces to better overcome the challenges that disaster and emergency relief workers face in a natural or humanitarian disaster.*

The Red Cross began collaborating with OpenStreetMap in 2012, primarily with long-term projects in various countries including Chile, Colombia, Indonesia and Uganda.[6] In Uganda, the American Red Cross engaged OpenStreetMap's HOT branch to help map the cities of Gulu and Lira where Red Cross teams were actively delivering relief services.[7] Among other things, this collaboration delivered maps showing the distribution of thatched-roof huts, vulnerable to fire, enabling local communities to be better prepared and more responsive to the threat of fire.[8]
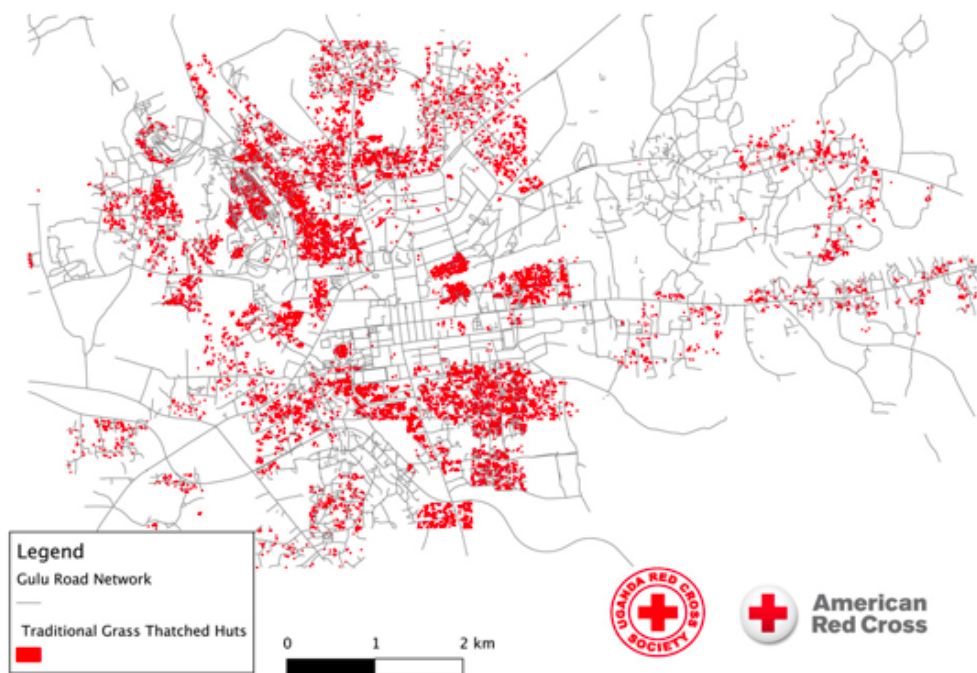


Areas of increased fire risk in Gulu municipality[9]

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* While it was staff within the American Red Cross that coordinated the Red Cross/ OpenStreetMap network on the Red Cross side, the larger Red Cross community was also involved in the network, either by supporting mapping efforts or by actually using the maps that were delivered. This case study, for the most part, refers to the Red Cross as a whole. ,

## Responding to Typhoon Yolanda/Haiyan

The first coordinated effort between the Red Cross and OpenStreetMap in a disaster response situation was the support of emergency international relief efforts for victims of Typhoon Yolanda/Haiyan in the Philippines—the country in Southeast Asia most affected by the cyclone. Considered the largest humanitarian disaster since the Haitian earthquake in 2010, the storm hit the Philippines on 8 November 2013. It became the deadliest typhoon in the history of the Philippines, killing over 6,000 people in that country alone.[10]

In order to help ensure the effective and efficient delivery of aid during the crisis, quality maps detailing local roads, building locations and infrastructure were desperately needed. Unfortunately, such maps did not exist until the American Red Cross's geographic information system (GIS) team worked closely with the United States Government and National Geospatial Intelligence Agency to support the mapping efforts. Twenty-four hours after the storm hit, the Department of State provided aerial imagery and the National Geospatial Intelligence Agency shared its gross damage assessments. The Red Cross in turn shared all this information with the OpenStreetMap community to prioritize areas for detailed mapping.[11] Digital volunteers then helped create base map data by identifying changes to bodies of water, roads, road blocks, buildings and other landmarks in before and after maps on the OpenStreetMap online platform (see map below).
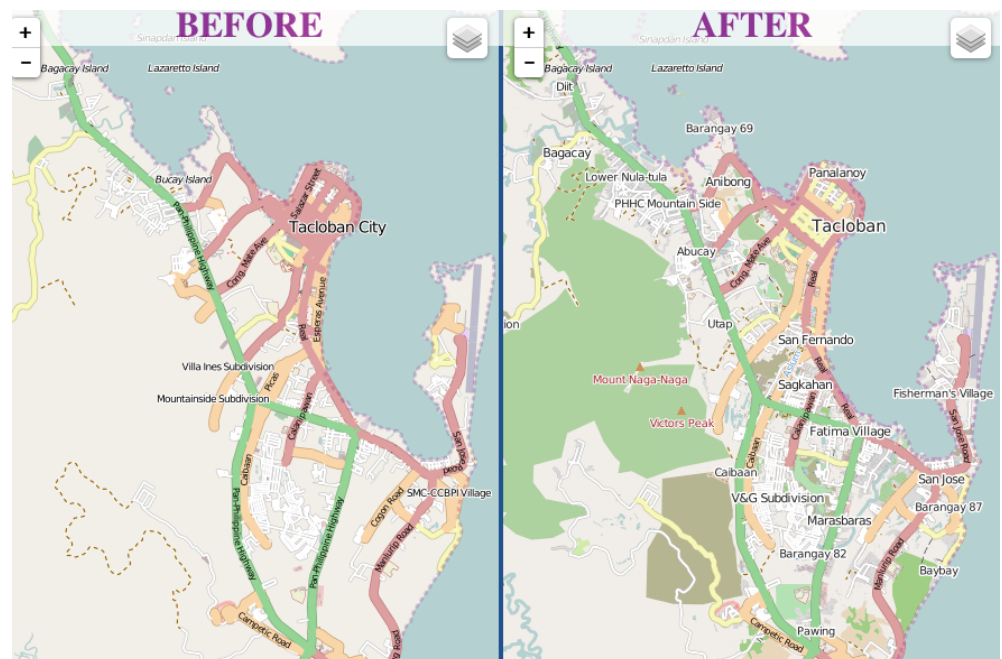


Maps delivered to aid workers as a result of Red Cross-OpenStreetMap collaboration[12]

At least 1,600 HOT volunteers were involved in this initiative, making about 5 million modifications to the open-source maps.[13] As the OpenStreetMap community populated the mapping platform with

current data, the Red Cross distributed maps for workers in the field to speed critical decisions about distribution of food, water and supplies. Had the Red Cross/OpenStreetMap Network not been activated, and had mapping efforts not been crowdsourced to a global army of online volunteers, the Red Cross's internal resources would have restricted the organization to using post-maps with minimal data—that is, maps detailing only where Red Cross staff were physically located when the typhoon hit, and where the organization was delivering relief.[14]

## Contributions to Global Problem Solving

This Red Cross/OpenStreetMap collaboration achieved legitimacy and effectiveness by developing an operational solution that existing mapping providers such as Google and Microsoft were unable to deliver— highly detailed mapping data in a real-time crisis situation. Thanks to a rolling Skype conversation between dozens of Red Cross and HOT team members, the network was able to determine priorities for mapping, and digital volunteers were then able to produce the data for these maps in real-time.[15] According to Dale Kunce, senior geospatial engineer at the American Red Cross: "These [typhoon-affected] communities were never mapped before. The most recent maps were from the US government, and they were from the 1950s."[16] In fact, even in cases where Google or Microsoft maps do provide geographic information about remote areas affected by a humanitarian crisis or natural disaster, the information is often flawed or incomplete. By contrast, the OpenStreetMap open source mapping platform enabled volunteers worldwide to share, cross-reference and verify data, which in turn ensured that the resulting maps were as detailed and operationally relevant as possible.

Another benefit, as Kunce explains, is that all of this capability was available to the Red Cross for free:

> *A lot of the time GIS software is very expensive. We have turned down a lot of offers from companies with proprietary software and data that they will give us for free for a year or two, but after that there is a licensing cost. What we want is free and open data. So the fact that the OpenStreetMap platform is open source saves the organization a ton of money.[17]*

The Red Cross/OpenStreetMap mapping network not only benefitted the Red Cross, it made a significant contribution to the disaster relief operations of the entire humanitarian aid community. The data that the network collected for the typhoon response was available for everyone to use, including the United Nations, World Vision and Médecins Sans Frontières (MSF), as well as local governments and communities. Access to accurate, current maps allowed these various organizations to make better-informed decisions on a plethora of operational issues (raising funds, delivering emergency supplies, finding missing family members, etc.) An added benefit of the network's

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commitment to transparency is that it helped build trust between the Red Cross/OpenStreetMap mapping network and other operational teams, a key element of integrated and effective relief efforts in emergencies.[18]

Sharing vital resources might seem obvious but, unfortunately, separate relief agencies routinely duplicate one another's work. But as Kunce said: "There is no reason why the UN, Care and the Red Cross should all go and collect the same [mapping] data. One group, supporting everyone, should collect the data and we should share it freely and openly among different actors."[19] Such a strategy can save both time and operational costs for all organizations involved.

The Red Cross/OpenStreetMap network also demonstrates that Operational and Delivery Networks depend on seamless collaboration and agreements among stakeholders, arrangements that take time to evolve. Dale Kunce from the Red Cross and Kate Chapman from OpenStreetMap both made it clear that existing human connections and understandings helped position the Red Cross/OpenStreetMap collaboration for success in its disaster relief efforts in the Philippines. Chapman, for example, attributes the network's success to the fact that the operational teams at the Red Cross and OpenStreetMap had prior experience collaborating on long-term projects in different parts of the world.[20] When the international community was faced with the pressing challenge of providing immediate disaster relief to the victims of Typhoon Yolanda/ Haiyan, these two organizations utilized their established relationships and understandings to lead emergency mapping efforts for the crisis.

In spite of the fact that US government agencies were not formal members of the emergency mapping network, their pre-existing relationships with the American Red Cross resulted in vital support and information in the form of aerial imagery and gross damage assessments—information that helped the Red Cross/OpenStreetMap network focus on the regions that most urgently required before-and-after maps. These examples help show that tapping into existing social and professional networks can help expedite the creation and effectiveness of an Operational and Delivery Network. Given the urgency of acquiring accurate and timely information in disaster situations, such relationships not only save time, they can save lives.

## Case Study 2:
## The RapidSMS Network

Organizations involved in development work—such as governments and NGOs—face many challenges when seeking to implement effective initiatives and programs to address the needs of the poor in the developing world. Some of the most common challenges include the geographic remoteness of many constituents; the lack of infrastructure required to serve those

> *RapidSMS has become an integral part for Operational and Delivery Networks that are focused on delivering essential services (from remote health diagnostics and nutrition surveillance to public health campaigns and community engagement) to poor and underdeveloped communities.*

constituents effectively (e.g., roads, electricity); and the inability to collect data about local needs and program impacts in a timely manner (due to paper-based records and slow transmission via courier systems).[21]

The RapidSMS platform addresses these problems by providing a mobile phone-based solution that enables service providers and development organizations to gather real-time feedback about local development needs and to assess the impact of their development programs. In doing so, RapidSMS has become an integral part for Operational and Delivery Networks that are focused on delivering essential services (from remote health diagnostics and nutrition surveillance to public health campaigns and community engagement) to poor and underdeveloped communities. Indeed, the case demonstrates the synergies that can develop between two distinct GSN types—in this case, between mobile computing platforms and Operational and Delivery Networks that use these platforms in the field.

Initially created by UNICEF Innovation in 2007, RapidSMS is now an independent, open-source platform that harnesses the power of text messaging for instantaneous data collection, complex workflow streamlining and group communication.[22] Quite simply, RapidSMS can support virtually any information-sharing requirement, and can be used by any operational network with access to a Web server and a field force and/or user base equipped with mobile phones. One of the most powerful features of the RapidSMS tool is the speed of information delivery. Data collected from users gets posted on Web-based dashboards as soon as it is received from a mobile phone. That means decisions-makers and field workers can assess needs quickly and monitor project data in real-time.[23]

Operational and Delivery Networks have already deployed the RapidSMS tool in over a dozen countries. For example, the Government of Rwanda is working with UNICEF and local non-profits to support healthy pregnancies and safe deliveries by using RapidSMS as a conduit for information transfer between patients and community health workers in remote communities, and between remote health workers and health officials in urban centers. Community health workers use the system to report on danger signs during pregnancy; subscribe to emergency alerts that help ensure that women can access obstetric care; and provide a real-time national supervision mechanism for maternal health.[24]

In Uganda, RapidSMS was used to create "Ureport," an SMS-based system that creates a direct communication link between young people, local NGOs, the Ugandan government and media. To date, over 210,000 young Ugandans have used the system to voice their opinions on matters affecting their community or the nation. Regular Ureport users receive weekly SMS-based polls that solicit their feedback on community services and other relevant issues. After answering the questions, users get access to the polling results and useful facts that can inform local action. The media frequently publishes poll results in newspaper articles, and through radio and television broadcasts, while UNICEF engages members of the parliament and other national leaders in dialogues to help address problems identified by community members.[25] In one

instance, a Member of Parliament launched an awareness campaign in her district after Ureport polling results showed that immunization levels for children under age five were extremely low in that region.[26]

With the support of UNICEF, healthcare agencies in Zambia and Malawi have also used RapidSMS to deploy a patient trackng and results delivery tracking system called "Results160." The platform ensures that the HIV test results for infants can be sent from laboratories to health care providers (i.e., community health workers, caregivers) via SMS rather than paper.[27] Community health workers also trace patients via RapidSMS to ensure that they receive key childhood interventions.[28] Thanks to the RapidSMS platform, HIV test results in these countries have been relayed with reduced turnaround times of about 50 percent, as rural facilities are no longer transporting paper-based results by road.[29] This reduced turnaround time is vital for saving lives as survival rates are demonstrated to be 75 percent higher for HIV-positive newborns that are diagnosed and begin treatment within their first 12 weeks of life.[30]
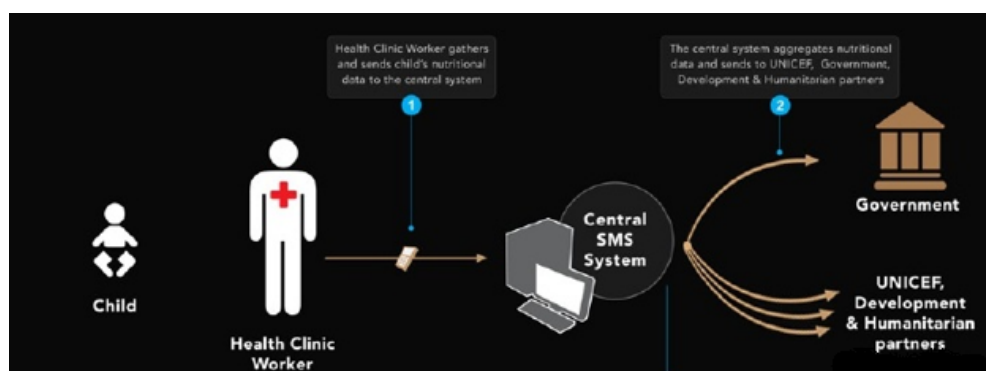


An example of how information can be delivered across the RapidSMS Network[31]

## Contributions to Global Problem Solving

One of the key virtues of the RapidSMS platform is that it simplifies and accelerates collaboration among stakeholders participating in Operational and Delivery Networks. Rather than replacing existing technologies with an entirely new system or complicated communication protocols, RapidSMS makes it easy for stakeholders—including governments, NGOs, local community workers and the general public—to leverage their mobile phones to communicate and coordinate amongst themselves. Young Ugandans, for example, can become "U-reporters" by simply texting the word "JOIN" to a toll-free number and answering a few basic questions. Once connected to the network, exchanging views with UNICEF or their elected representatives is as fast and convenient as sending a text.[32] A population of young people that was largely ignored and disaffected is now helping solve some of the country's biggest public policy issues.

*" Users of the RapidSMS platform have come to recognize two-way exchanges of information between community members and development practitioners are more valuable than simple data collection. "*

Another virtue of the RapidSMS platform is that the underlying code is open-source, which makes it easy to design new uses for it. This flexibility means that Operational and Delivery Networks of just about any description can modify RapidSMS to support their particular communication and service delivery needs. In fact, the network that is working on improving and deploying RapidSMS has grown considerably over time. The global community of software developers that is actively refining the growing code base includes developers from Senegal, Mali, Nigeria, Kenya, Uganda, Canada, UK and the US.[33] These software coders are joined by telecom providers, international organizations (such as UNICEF), NGOs, universities, government agencies and local communities, all of which share their local RapidSMS deployments and collaborate in varying degrees to deliver development programs in countries across the world.

Moreover, the RapidSMS community deploys what coders call "modular design," meaning that the system subdivides into smaller, self-contained parts (or modules) that are independently created and then used to drive multiple functionalities. This allows a single deployment to be used and adjusted for a variety of purposes.[34] Operational and Delivery Networks that become comfortable with the technology can "plug-in" and customize various modules to undertake more sophisticated uses over time. For example, it would be fairly easy for an Operational and Delivery Network that is already using RapidSMS as a tool to collect nutrition indicators in a given community, to enhance their data by adding the capability (or modules) to also collect food inventory data, thereby obtaining a more comprehensive view of the community's nutritional status.

Users of the RapidSMS platform have come to recognize two-way exchanges of information between community members and development practitioners are more valuable than simple data collection. Christopher Fabian, co-leader of the UNICEF Innovation Lab, explains that the power of RapidSMS "is not just about getting information to us, but also providing something of value back to the person that's providing the information."[35] Fabian provides an example of a health worker at a remote clinic sending an SMS to indicate that the clinic is running short of medical supplies. Rather than waiting for the next monthly distribution to ship, central health authorities can respond immediately and provide an estimate of when new supplies will arrive.[36] UNICEF has also begun to understand that information loops enabled by RapidSMS can make Operational and Delivery Networks self-sufficient, without the direct involvement of UNICEF. "Teachers in rural schools send an SMS to the government saying that the textbooks haven't arrived and government goes and sends them. Done. And that collaborative relationship will last way beyond UNICEF," notes Fabian.[37]

Fabian insists that Operational and Delivery Networks should establish guiding principles to promote effectiveness and to govern interactions between stakeholders. In particular, he points to five innovation principles that helped make the RapidSMS platform a success. These are:

1. Embracing open-source solutions

2. Encouraging users to build and adapt the platform locally

3. Accepting failure as a natural element of operational work

4. Building local capacity to sustain the network

5. Building the system with the end-user (i.e., the recipient of the goods and services) in mind.[38]

In fact, these five principles not only guide the RapidSMS platform, they also guide many of the Operational and Delivery Networks that are deploying the platform. Fabian explains: "These principles make so much sense that it's not only about technology, but it's also about how we design our work, our interventions and our discussions with users and stakeholders."[39] In fact, the principles guide all work at the UNICEF Innovation Lab, and have also been picked up by other UN agencies, including the UN Development Programme and the UN High Commissioner for Refugees.

# Case Study 3: Global Libraries

In 2011, the UN declared that the Internet is a fundamental enabler of human rights because it provides access to information that has profound health, economic and social benefits for individuals and their families.[40] A recent report by Deloitte demonstrates that increasing connectivity in the developing world improves human development.[41] It also predicts that greater access to the Internet in the developing world could expand economic productivity by up to 25 percent, generating $2.2 trillion in GDP and more than 140 million new jobs, which could lift 160 million people out of poverty. And yet, of the world's 7 billion people, only 2.7 billion have access to the Internet. The vast majority of the 4.3 billion that remain unconnected live in developing countries, especially in rural and poor communities.[42]

In order to help close this enormous divide, the Gates Foundation launched Global Libraries, an Operational and Delivery Network that aims to provide public access to the Internet and relevant technologies (computers, e-readers, mobile phones, etc.) through public libraries around the world. While the network originally focused on improving access within the United States, it has since expanded worldwide and is now operational in more than a dozen countries, including Colombia, South Africa, Romania and Vietnam. In addition to improving access to the Internet, the network trains librarians and local community members to use these technologies for information gathering and community development.[43]

Global Libraries works with an array of stakeholders to reinvent public libraries as institutions that can be leveraged for human development, including government agencies, NGOs, private companies and library representatives (including library associations). For example, public libraries in Romania have partnered with their local and national governments to promote online access to agricultural subsidy accounts at libraries. Farmers and fishermen in Ghana have collaborated with their local libraries to use the Internet as a tool to promote their products and get access to current market prices.[44] In rural Ghana, an international NGO within Global Libraries (Electronic Information for Libraries) partnered with a local library to give pregnant women living in remote areas access to information on pre-natal health through SMS, effectively bringing the library experience to their mobile phones.[45] And in rural Botswana, public libraries have become hubs for helping entrepreneurs and small business owners leverage technology to make their businesses more sophisticated and competitive.



At a community technology center in Villa Mella, Dominican Republic, a program called TechnoChicas provides computer skill training to girls.[46]

In order to foster innovation, the Gates Foundations has introduced three levels of collaboration within the Global Libraries network. One level occurs between the Gates Foundation and operational countries, mainly through the delivery of grants and operational advice (e.g. communication and outreach support). A second level occurs among stakeholders within an operational country. Darren Hoerner, Program Officer at the Gates Foundation who has been involved in the Global Libraries initiative since its inception, provides an example of such collaboration:

> *Once grantees are identified, they become responsible for developing and leading a national program that draws in stakeholders from a variety of sources within the country. For instance, in Poland, our grant goes to the Polish-American Freedom Foundation, and they have built an incredible stakeholder network that includes government ministries, the private sector (such as Microsoft and Orange Telecom), and a lot of NGOs, in order to determine how to deliver effective services through the public libraries system.[47]*

A third level of collaboration occurs across the entire Global Libraries network, with country teams and stakeholders sharing knowledge and best practices for modernizing libraries and facilitating community development.[48] According to Hoerner and his colleague Zola Maddison, three mechanisms help facilitate horizontal collaboration across grantee countries.[49] These are:

1. An online community that links all stakeholders in Global Libraries and serves as a platform for sharing operational experience, training modules and ideas on how to innovate.

2. Peer learning meetings (that take place roughly every 18 months), which country teams attend in order to meet network colleagues face-to-face.

3. Working groups that bring together network members who share the same operational functions (e.g. technology, training, advocacy or evaluation specialists).

The Data Giraffe tool, which was created by the country teams in Romania and Ukraine, provides an example of how collaboration across the network is helping grantee countries create innovative, bottom-up solutions to continually improve the Global Libraries program. Data Giraffe is a Web-based tool that enables Global Libraries to track whether computers within each public library in the network are being used to capacity by the local community. This information can help the Gates Foundation assess the effectiveness of the country-based teams and guide necessary interventions on a case-by-case basis.[50] Matej Novak, who leads the Global Libraries Country Team in the Ukraine, explains that the tool was initially built in Romania and then improved by the team in the Ukraine. After piloting it in both countries for two years, the country teams in Romania and Ukraine shared the idea at a face-to-face peer learning meeting in 2013. Country teams across the network expressed interest in using it, so the Romanian and Ukrainian teams are back at work building a more powerful and secure version that will be shared with all countries in the network over the course of 2014.

## Contributions to Global Problem Solving

Despite impressive gains in Internet penetration in recent years, the 4.3 billion people that still lack access to this essential resource are at great risk of falling further behind as technological innovation races ahead. The vast majority of these information have-nots live in developing countries, which means that those with the greatest need often do not have the means to access valuable health, education and government information that could improve their lives.

Libraries, which have historically served as centers of information and knowledge, are well positioned to help close this gap. There are more than 315,000 public libraries worldwide, and an estimated 73

> *…The Gates Foundation has built a … network that encourages collaboration at the country level and then facilitates peer learning and the sharing of innovations between client countries.*

percent located in developing and transitioning countries.[51] Therefore, by providing public libraries in developing areas with Internet access, citizens in those parts of the world can more efficiently join the digitally connected world, and have unprecedented access to technology that will eanble them to apply for jobs, learn about how to grow a business, become informed about health issues that affect them, and communicate with family and friends located across the world.

Indeed, for countries with limited access to the Internet, Global Libraries is showing that the right investments in infrastructure and know-how can help public libraries become centers of online connectivity, training and personal development. Libraries across the network are providing much more than access to the Internet—they are helping community members pick up key skills in such areas as economic development, financial literacy, e-government and health promotion. To date, the Gates Foundation has invested $285 million in more than 23,000 pubic libraries through the Global Libraries program.[52] Without this level of investment, the libraries in the network could not make available the kind of services they provide today.

The money invested by the Gates Foundation, however, is not the only factor driving the network's success. Unlike traditional philanthropic interventions in which communications flow only between the donor and grantees, the Gates Foundation has built a broader Operational and Delivery Network that encourages collaboration at the country level and then facilitates peer learning and the sharing of innovations between client countries through a combination of face-to-face meetings and online communities. After a decade of collaborating with governments, non-profits and private partners around the world, the network has grown beyond its original objective of closing the digital divide in the US, and gone on to tackle digital divide issues in some of the world's most deprived communities.

# Implications for Network Leaders

**Significant operational innovations do not necessarily require a large budget.** Large development institutions and NGOs have often shied away from technological solutions because of the perception that technology implementations are too expensive. But both the Red Cross/OpenStreetMap and RapidSMS networks show that high-impact innovations do not necessarily have a high price tag. Innovation is about identifying ways of doing business more effectively and efficiently, and well-executed projects can often help networks save money.

The Red Cross saved money by collaborating with OpenStreetMap volunteers on an open-source platform, rather than investing in private sector mapping solutions. Similarly, development workers in Zambia and Malawi

eliminated printing and transportation costs by replacing the paper-based model of tracking HIV test results with a RapidSMS solution that enabled community health workers to use their mobile phones for record-keeping.[53]

In both cases, these innovations not only saved precious resources, they also saved lives. The SMS-based solution to delivering HIV test results in Zambia and Malawi, for example, reduced the relay times of these results by about 50 percent—a significant outcome given that survival rates are 75 percent higher for HIV-positive newborns that are diagnosed and begin treatment within their first 12 weeks of life.

**Sharing key assets can lead to better and faster collaboration.** All three case studies demonstrate a direct positive relationship between asset sharing and better collaboration. The Red Cross/OpenStreetMap network made its mapping data of the typhoon-ravaged Philippines freely available to other relief agencies, including the UN, World Vision and MSF, as well as local governments and communities. Sharing this vital asset not only allowed the broader community of emergency responders to do a better job of addressing the needs of Filipinos affected by the disaster, it paved the way for deeper collaborations in the humanitarian relief sector that could significantly boost operational effectiveness in the future.

In the RapidSMS community, open source programmers and development practitioners around the world are constantly expanding the functionality of the platform and generating new modules that can be implemented by Operational and Delivery Networks focused on a wide range of issues. And in the Global Libraries network, the Romanian country team shared the network-monitoring tool it piloted with the Ukrainian country team, which in turn led to ongoing collaborations between the two countries that spawned the creation of Data Giraffe—a bottom-up solution that has since proliferated across the Global Libraries network.

**Promoting technological skills and awareness within an institution, organization, or community can enable greater opportunities for networked collaboration.** Of the thousands of people that contributed to the Red Cross/OpenStreetMap humanitarian efforts in the aftermath of Typhoon Yolanda/Haiyan, many were citizens of the Philippines—the country most affected by the deadly disaster. Many of these Filipino contributors had prior training on how to add mapping data to the OpenStreetMap platform, which gave them a unique ability to quickly leverage their local knowledge of the communities affected by the typhoon.[54] This suggests that both governmental and non-governmental crisis response organizations could improve their operational effectiveness by offering technical training on the use of OpenStreetMap to populations living in and around vulnerable disaster zones.

We have also seen how open-source coding capabilities played an important role in all three networks featured in this report—OpenStreetMap, RapidSMS and Data Giraffe were all created using open-source code. The growing use of open-source tools by Operational and Delivery Networks suggests that network leaders should consider providing

basic training in open-source coding to enhance collaboration between software programmers and non-technical participants and staff members. Websites with user-friendly training on the fundamentals of coding include codeacademy.com and decoded.com.

**Operational and Delivery Networks that harness mobile computing will be more successful in engaging and empowering young people.** The mobile revolution is demonstrating that harnessing the power of mobile phones can significantly strengthen the voice and agency of youth. Young people around the world are increasingly avid mobile users. As Chris Fabin notes, "It's more important for many kids in the developing world what mobile phone network they are part of, than what flag they sit under, because people using the same mobile service provider can call and text each other at drastically lower prices than if they were part of different mobile carriers."[55] This youth connectivity, in turn, presents an unprecedented opportunity for engagement. Instead of primarily depending on what parents, educators and local government officials believe the youth in a given village need, RapidSMS enables development practitioners to ask young people directly what their needs are and how they can best be served. This is the very logic that guided the Ureport initiative in Uganda, and which led young people in that country to use mobile phones to influence their representatives in Parliament.

**Operational and Delivery Networks are not immune to politics.** Both the composition of the network and its regional focus will affect the network's legitimacy and its opportunity for impact. The RapidSMS Network has been successful in assisting development operations throughout Africa (e.g., maternal care, food shortages, HIV monitoring and care). However, there are many instances in the world today of political leadership that is threatened by the ease with which communications and group motivation can be accomplished using mobile technology— the latest example being the attempted blockade of Twitter, YouTube, Facebook and Google by Turkish Prime Minister Recep Tayyip Erdoğan.[56] The speed and effectiveness of RapidSMS and other similar systems can easily be construed as a threat to an unstable government.

The Global Libraries program has operated in over a dozen countries, yet none of these operations is based in the Middle East. Why? Globalization has met with profound and sometimes violent cultural resistance throughout the Middle East on many fronts. Resistance to the installation of Western-derived information portals may be symptomatic of this cultural caution. The modernization that is suggested by these programs may be perceived as a challenge to traditional aspects of these societies, particularly those aspects that are based on deep-seated religious beliefs. The opportunity for any network seeking to establish services in the Middle East will be derived by making its program one that strengthens the society and stabilizes the existing order.[57]

Among the three case studies, the Red Cross community is arguably the player best positioned to work in politically sensitive circumstances, in large part because of the principle of impartiality that it has strongly attached to its brand. Network leaders seeking to penetrate politically

challenging environments might gain greater credibility by emphasizing their neutrality in politics (if applicable), or by aligning themselves with a player perceived as legitimate within the targeted market or society (such as an influential business or thought leader, or a politician).

**Embracing multi-stakeholder collaboration is a lengthy learning process that requires fundamental shifts in an organization's culture.** How can leaders of traditional organizations better position their teams as they seek to interact with different sectors (government, private sector, NGOs) and build Operational and Delivery Networks? How can staff become more passionate about collaborating with different stakeholders and innovating to solve global problems? The Operational and Delivery Networks featured in this report suggest that the first step in solving global problems is to change the way organizations think about problem-solving itself. UNICEF, for example, has worked hard to instill new thinking about the power of networks and collaboration, and now uses the five innovation principles mentioned earlier to guide its work.[58] While the principles may differ based on the circumstances, the critical lesson is that investing in this type of cultural change is a multi-year process. Organizations seeking to join or build an Operational and Delivery Network must be prepared to invest in training staff to think differently about the power of networks, collaboration and innovation to create a better world.

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# About the Author



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## About Global Solution Networks

Global Solution Networks is a landmark study of the potential of global web-based and mobile networks for cooperation, problem solving and governance. This research project is a deliverable of the GSN program, offered through the Martin Prosperity Institute at the Rotman School of Management, University of Toronto.

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