GDN's Next Horizons Essay Contest 2014*
THE FUTURE OF DEVELOPMENT ASSISTANCE
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Winning Entry

"'WHAT GOES UP, MUST COME DOWN': THE ROLE OF OPEN DATA IN IMPROVING AID ACCOUNTABILITY"

Abstract
Open data and technology are increasingly seen as ways of improving communication between aid donors and recipients. Yet there is a recurring problem in the feedback loop connecting open data collection and application in development programs. Technology is increasing the capacity of central authorities to collect data from communities, but this increased knowledge has not returned to the communities in the form of targeted, responsive policies. This essay looks at how technology can be used to improve both the collection and the application of data in development programs related to primary health care in developing countries, using its potential role in overseas aid for the recent outbreak of the Ebola virus as a case study. The approach highlights the need to engage communities by ensuring that their input influences government and donor health programs, and that information and communication technologies in development emphasize "communication" as much as "information." This will help create a self-perpetuating feedback loop in which health needs shape health supply, minimizing the waste of limited aid resources on programs that are medically or contextually irrelevant to a community.

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Introduction

War, said Napoleon, is 90 percent information. The assessment holds as true in the fight for global development as it did on the battlefields of Austerlitz. We live in what is referred to as the Information Age, where technology has significantly increased the rate at which information can be gathered.

The chief executive officer of Google, Eric Schmidt, recently opened a conference in California with the observation that every 48 hours we now create as much information as we did from the dawn of civilization to 2003. This deluge of digital information, or "big data" as it is commonly known, is widely believed to be capable of improving state and aid agency ground-level information on the development challenges facing communities.

Recently the focus has shifted to the role of "open data": data collected directly from the public using new technologies whose use is socially normalized and which channel huge amounts of data from users on individual use habits, behaviors, and preferences. Popular sources include social media, websites, mobile phones, and other public channels where data can be published and accessed without use restrictions.

Rapid advances in technology and affordability have strengthened public use of these tools in developed and developing contexts alike. This opens up a vast pool of data to development agencies, which can use recipient feedback to optimize programs. From a recipient perspective, the feedback link is also helpful for ensuring that donor aid is used appropriately and efficiently, for instance by identifying instances of corruption.

The question now facing the development community is how to realize these theoretical gains in a systematic way. As a process where public input controls information, open data is often seen by technology optimists as the democratization of knowledge. A problem with this view is the question of just how open the bulk of information is to its would-be users. Increased physical access to information in developing countries does not necessarily mean the information is accessible in the sense of being clear, comprehensible or user-friendly— qualities that the field expert Jonathan Fox groups together under the term "data transparency."

As the familiar quote from Einstein goes, information is not knowledge. To make information gathered by open technology relevant, there need to be systems for ordering and analyzing it. It is a matter of harnessing big data and transforming it into relevant knowledge that can be used in project planning, a process known as "structuring" the data. The risk otherwise is of a system where information is given to central authorities via collaborative networks and feedback mechanisms, but never returned to citizens in the form of policies that respond to the needs identified in the data.

In order to fulfill the expectations of accountability, transparency and citizen empowerment presented by open data, overseas development assistance needs to focus not only on using

technology to gather better-quality data, but also on rendering data usable to communities and state authorities—making it actionable.

This essay will identify some of the problems with the current use of open data in development, and propose solutions with a focus on the field of public health. It will first provide a basic overview of the current uses of open data in development. This will be followed by analysis of open technology models in primary health care, identifying obstacles affecting their use value in aid programs and offering practical suggestions on how these could be overcome. The Ebola virus outbreak in Western Africa will be used as a case study to demonstrate how open data have been used and could be maximized in overseas development assistance to bring about effective, sustainable support to national health systems. The conclusion will offer recommendations on how donors can maximize their contribution to data management in development and maintain a productive feedback loop between donors and recipients.

Use of Open Data in Development

Successful examples of open technology in development exist in a variety of sectors, including health, education, humanitarian aid and political governance. Open-source software platforms such as Ushahidi have been used to collect and visually map data on events requiring external assistance. Such platforms typically gather information from citizen reports submitted online or via text messages, a technique known as crowdsourcing; it also uses other components such as geotagging, where geographical metadata are attached to a report to identify its provenance or reference.

These open-source platforms are simple, free and adaptable by users—all essential elements of their success. They have been used to monitor election fraud in Kenya, identify humanitarian needs in areas hit by natural disasters, record civic crime rates and unrest, and report corruption. Other programs have used open data software to track the results of aid programs, ensuring aid delivery and accountability and reducing corruption.[1]

There are two weak points in the current use of open data in development. The first is a tendency to assume that data collection alone is sufficient. This is not to say that surveillance is not important: New technologies offer significant opportunities for data collection, which could address a systemic problem with poor data in development, and the ability to store individual preferences offers development organizations "an opportunity to

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[1] The World Bank, for instance, used text messaging feedback from lorry drivers in Nepal to evaluate whether grants intended for road repairs had been used according to state guarantee—Gigler et al., *Closing the Feedback Loop: Can Technology Amplify Citizen Voices?* 17.

figuratively take the pulse of communities."[2] Unlike household surveys, digital data are available in real-time and facilitate the accurate mapping of service needs at a given time in a given place. The use of open data should be a core component of initial program design.

The second critical point often overlooked in open data initiatives is the need to make data accessible to citizens. This not only improves local awareness of issues, but, crucially, allows community members to use information from centralized, reliable sources to draw national and international attention to problems in their own communities. Aside from promoting citizen empowerment, it also creates incentives for participation by making local people feel that their input can lead to a change in existing services.[3] Open data needs to be a two-way process, with information fed from communities into government policy for those same communities. Like Newton's third law of motion, what goes up, must come down.

The real question, then, is how to leverage open data in development to improve its use value for action, not just information. We need a new kind of data revolution, one where data revolve between communities and authorities. Data should be provided by citizens, centrally aggregated and analyzed, and the results returned to the communities who provided the raw data. Open data in development should resemble the use of data by the Swedish medical statistician Hans Rosling: revolutionizing recipients' knowledge using facts they already knew, presented in a way that opens up their meaning. "Open data" adopts an alternative meaning: opening up data.

Use of Open Data in Health

Every year billions of dollars are given to developing countries in the form of development assistance for health (DAH). Between 1990 and 2007, total DAH quadrupled from $5.6 billion to $21.8 billion.[4] Yet the needs of national health systems in developing countries continue to outpace donations. The realization is dawning that in order to keep up, DAH needs to modify its approach and focus on increasing spending efficiency to maximize the health value of each dollar given.

Aid agencies and nonprofit organizations (NGOs) have already begun using open data to improve aid delivery in a variety of contexts. The aim is to incorporate citizen feedback and reporting into aid projects to improve their speed and efficacy. This has included using data tracking to identify the worst-hit areas following natural disasters such as the 2010

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[2] United Nations Global Pulse, *Big Data for Development: Challenges and Opportunities*, 9. For a good overview, see Sandefur and Glassman, *The Political Economy of Bad Data: Evidence from African Survey and Administrative Statistics*.

[3] Gigler et al., *Closing the Feedback Loop*, 5.

[4] Institute for Health Metrics and Evaluation, *Financing Global Health 2009: Tracking Development Assistance for Health*, 6.

earthquake in Haiti, monitor disease trends, and identify health needs of specific communities.

Another dominant interest has been in the predictive power of large-scale data sets or "big data." According to research from the United States Centers for Disease Control, mining online health data can help detect disease outbreaks "before confirmed diagnoses or policy confirmation."[5] Even private companies have bought into these efforts: Google Dengue Trends measures the frequency of online searches for dengue fever symptoms and related enquiries, to detect disease activity across the world, while Twitter has been used to predict flu outbreaks in the United States.[6]

The benefits of incorporating open data into DAH projects are significant. The data can be used to redirect donor focus from country averages to local or even individual problems, crucial for providing aid programs targeted to local contexts. Real-world data are typically less expensive and easier to obtain than clinical trial data, and are as accurate—if not more so, given their direct link to the real-world health problem.

Real-time reporting can improve data quality as well as quantity: Suspect data can be identified and questioned almost instantly, such as a reference to male cesarean sections in one Kenyan health care report.[7] Rapid, targeted response is likewise made easier, particularly important in health care because of the rate at which infections and outbreaks can develop. Use of open data may be the only way to keep up with a virus.[8]

Finally, using open data to disseminate knowledge means patients are able to share their experiences with different clinics, diseases, and treatments. This can facilitate a sense of trust in medical aid interventions such as vaccine programs by transforming them from a foreign to a familiar experience, and helps dispel fears about aid motives, which can disrupt interventions dramatically, as was seen in the 2003 boycott of polio vaccine programs in Nigeria.[9] Trust and privacy are two major concerns related to the use of open data, from both user and provider perspectives. There are legitimate concerns over what data will be

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[5] , 11.

[6] Eke, "Using Social Media for Research and Public Health Surveillance."

[7] Personal communication, Dr. Anifalaje Adibusoye, based on his experience working with health information systems in Nigeria.

[8] , 37.

[9] The polio immunization drive was brought to a standstill in July 2003 as religious and political leaders in northern Nigeria responded to fears that the vaccines were deliberately contaminated with anti-fertility agents and the HIV virus. A full account is given in Yahya, "Polio Vaccines—'No Thank You!': Barriers to Polio Eradication in Northern Nigeria."

accessible to which organizations, and whether patients will have a say in how their own data are used.

Studies have shown that when patients have access to their own health data, they are significantly more likely to be willing to share the data with aid organizations.[10] The double bind is that too much privacy at an institutional level undermines the collaborative benefits of open data: It stifles innovation and prevents the dissemination of relevant knowledge to create accurate and timely aid responses to key health problems. Addressing privacy concerns will require greater regulation and standardization of reporting practices and institutional mechanisms for penalizing breaches of trust.[11]

From Passive to Active

From a development viewpoint, the aim of incorporating open data into public health programs should be to take advantage of the benefits it offers—speed, accessibility and contextualization—not just to enlarge government data banks. Open data are a means, not an end. At present there is a systemic problem with the digitalization of health information systems in developing countries, with data being routinely submitted by individuals or community health workers but ignored by policymakers.

Shirin Madon describes a typical instance of a survey for improving village health facilities in rural India, where patient opinions were collected and sent to the national authorities to help them target the facilities for which there was the most need. The result was silence and a community sense of frustration and neglect: "We feel like students who sat an exam and never got the results."[12]

Aside from failing to uphold its potential to promote more participatory health care, lack of data use also obstructs aid agency cooperation. It contributes to the siloing of health projects in areas where collaborative efforts would lead to a more efficient use of resources.

The way to confront the one-way data street is to begin creating clear feedback loops between aid agencies and communities. The etymological roots of the word "data" reside in

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[10] Pickard and Swan, *Big Desire to Share Big Health Data: A Shift in Consumer Attitudes to Share Personal Information*.

[11] Interestingly, in an era where personal details are habitually shared online—bank account details for online purchases, website cookies tracking site preferences—it almost seems that there may be more resistance to data sharing by private companies and other institutions that are keen to protect their data from competitors. In public health, data ownership might well become the 21st century equivalent of the pharmaceutical patent debate.

[12] Madon et al., "Can Mobile Phones Help Control Neglected Tropical Diseases? Experiences from Tanzania," 108.

the Latin for "thing given," giving it a passive sense. A development use of data needs to become active, by focusing on making the information usable by aid organizations.

DevTrac, a project run by AidData in Uganda, is a strong example of how this could be managed. It is a platform that coordinates government public investment with feedback from community members, using an online database to track aid projects across the country and display the results in a public visual map.[13] Through this integrates top-down and bottom-up data and compares the results to identify gaps between needs and services, redirecting investment where necessary.

DevTrac's integrated approach bucks a trend in the use of big data in development. So far the dominant interest from donors has been in using open technologies in the implementation stage of a project cycle, for monitoring purposes and to report program results to internal and external stakeholders. Aid agencies could do a lot to redirect this focus. Instead of primarily collecting the data and sending them further up the development chain, toward policymakers and their own internal hierarchies, donors could work to promote the incorporation of data from the community level by promoting citizen reporting as a standard component within aid project monitoring and evaluation.

Building channels that use open data for continuous communication between donors and recipients would increase health program efficiency and reliability. By using an aggregating platform to structure the data collected by citizen reporting channels, donors could see in real-time exactly what health services are needed by which community. Responses could then be aggregated and analyzed to see whether the results correspond with aid activity in a given area; if not, the data could be used to tailor existing programs or begin new ones.

Finally, agencies could work to increase community access to data on local health issues, promoting individual health-seeking behaviors and local activism on areas of particular need. However, this needs to be based on an understanding of data as a means not an end. In their critique of open data in development, Parminder Singh and Anita Gurumurthy make the valid point that citizens may not always want data access in itself—what they want are the development resources which better data should bring: increased access to sanitation or employment opportunities.[14] It is the responsibility of development agencies and donors to ensure that better knowledge translates to more effective programs.

Closing the Gap

One of the first steps for improving the use of development data is to identify who should be doing what within a new data ecosystem. This is important for helping aid organizations

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[13] Staid, "Beyond Open Data in Uganda: How Do We Make Citizen Feedback More Actionable?"

[14] Sing and Gurumurthy, *ICTD—Is It a New Species of Development?*

understand their potential role in fostering and sustaining new data use habits within the development community. It is also critical for establishing clear accountability structures that allow stakeholders and external actors to ensure that key roles are undertaken (Figure 1).

Figure 1. A simplified data life cycle, showing the elements and stakeholders involved in data provision, collection and use.
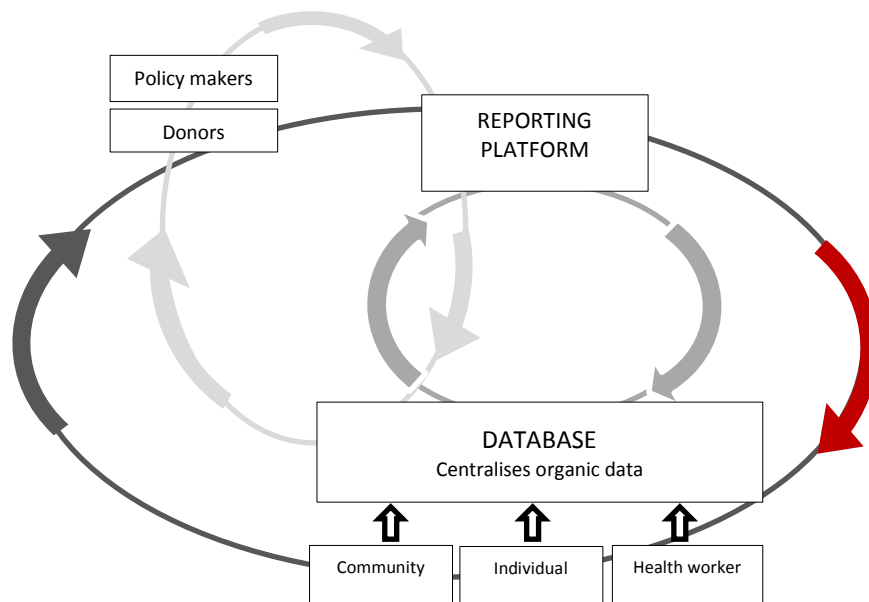
At the interaction points between data and stakeholders, there is an opportunity for intervention. The largest loop travels from the community database to policymakers and donors, through their cycle of review and feedback, into a public reporting platform and then—the critical step—back down to the community the data came from (the red arrow). This can be achieved through policy, information-sharing or alternative channels, but the important thing is for it to happen in a way that makes the data relevant to citizens, showing the value of their data contribution and keeping the cycle turning.

This diagram does not represent a unified technology system along the lines of an electronic health information system. No single software, server or built-in system is required for the process to work—a stark contrast to the earlier forms of eHealth, whose legacy in Africa can still be seen in the prevalence of highly engineered and painfully siloed solutions. Figure 1 shows the basic component functions needed for efficient management of development data in an aid project.

From a donor perspective, the approach combines two primary areas of consideration in data projects: the technical infrastructure required to collect and structure the data, and the political integration of data into policy by the major actors involved in the process. By

deliberately avoiding conceptualizing these as distinct categories, the diagram shows donors the role they could play in bringing the two together.

This reflects a paradigm shift in attitudes toward technical structures for data in development. The technology is no longer the issue; instead, the challenge lies in how to use new technologies, particularly social, to organically access data from communities and programs in a simple but highly replicable manner. Initiatives such as crowdsourcing and Ushahidi-style platforms are showing that this is possible. Donors should actively encourage this trend, using grants as incentives to move health informatics away from systems and toward individuals.

There is also a clear role for aid donors in normative work around the data itself. Universal reporting standards governing the initial collection of open data would be immensely helpful to everyone. The recently released International Aid Transparency Initiative (IATI) Standard Framework is a good example of how data standardization could work, providing donors with code lists that allow them to structure data in a consistent format for easy comparison with other organizations' data once they are uploaded to the IATI Data Registry. The raw data are comparable, in an open-source format, verifiable, and securely hosted.[15]

Aid donors are ideally positioned to promote this kind of standardized approach to surveillance. The more active role it would give them in shaping the field highlights the changing role of aid and philanthropy within development, from a top-down model to a collaborative process of co-created solutions.

Finally, the aid community could use its expertise in monitoring and evaluation to strengthen the return of information to citizens: the feedback "missing link" shown by the red arrow in Figure 1. By making reporting more user-friendly, they would be steering evaluation away from the research environment and toward a more digestible format for program beneficiaries. This devolution of feedback power would create a shift from supply-driven initiatives to demand-driven initiatives. This could occur by changing reporting standards, using more visualization for example, but also by supporting user-oriented technologies such as Ushahidi or text-message reporting.

Donors could also use technology to assess aid programs from a more qualitative perspective, using crowdsourcing or canvassing to collect a critical mass of individual opinions. This would help identify differences in the implementation of aid initiatives in different settings, identifying the social, political or economic drivers behind varying success rates. In other words, aid donors would become the perfect bridge between the technology and the communities it is meant to serve, making the human factor in information and communication technologies for development as important as the technology.

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[15] For more details, see International Aid Transparency Initiative, *Introduction*.

Case Study: Ebola

The easiest way to demonstrate what this could look like is by example. This section explores the use of open technologies in the 2014 Ebola outbreak in Western Africa.

Early in the outbreak, the spread, speed and social aspects of the Ebola virus made the value of open data technologies obvious. The rate of infection and early suspicions of international aid workers made it difficult for the aid community to gather sufficient data on the extent of the outbreak, such as by tracking new cases, survival rates and epidemiological trends. In the World Health Organization's Ebola response plan, data management for understanding of transmission triggers was identified as one of the most urgent needs.[16]

Open data projects and technologies have since been applied in a number of different areas, with the aim of facilitating contact, trust and information sharing between communities and aid organizations. Several projects such as Liberia's mHero and the United States Agency for International Development's (USAID's) U-report are using social technologies such as text messaging and Whatsapp to improve communication between communities, health care providers and donors, meaning better data and better aid allocation.

The mobile phone's value as a community communication device has made it a critical part of the Ebola response, leading Eric King of USAID to declare that "among the technological tools that have amplified the Ebola response, arguably none has been more helpful than the mobile phone."[17] It has a number of virtues—it is simple and user-friendly and the data collected are relatively standardizable—but the crucial element is feedback.

The mobile phone was invented to improve communication, so it is not surprising that this remains its main contribution to development. Liberia's Ebola Community Action Platform (http://www.ecapliberia.org/), funded by USAID, has shown how this can be applied in a bottom-up approach to data, using Whatsapp to crowdsource community engagement in Ebola efforts, in order to understand how best to engage communities by learning from the communities themselves.

The problem facing most Ebola-related open data projects is that they rarely look at sustainability. If there is anything the Ebola crisis has demonstrated, it is the need for the global public health and aid communities to focus on overall health system strengthening. New aid projects using data should be looking for ways to integrate with government services from the outset, in contrast to the more typical approach of waiting for

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[16] World Health Organization, *Ebola Virus Disease Outbreak Response Plan in West Africa.*

[17] Eric King, innovation specialist with the Digital Development Team in the Global Development Lab. Online blog post for USAID, June 2015: https://blog.usaid.gov/2015/06/qa-how-technology-is-transforming-ebola-response-efforts/.

independent funding to expire before seeking government support, at which stage the latter is unlikely to engage, having no experience with that particular service and no budget for it.[18]

Integration is at the heart of the data feedback loop, and keeping this in mind could help donors encourage solutions that consider links with the formal health system at an earlier stage, even facilitating these links where possible. The Liberia Ebola Community Action Platform, for example, clearly states that the program will run only until June 2016, indicating that it is limited to the duration of the Ebola outbreak. The platform's donors, such as USAID, would benefit from considering how it could be applied to other diseases as a proven channel to improve community feedback on projects.

Expanding the focus from epidemics to wider health promotion could significantly improve local access to knowledge on areas missed by the current health system, such as chronic diseases. In 2014, just over a third of all deaths in the country were due to chronic conditions such as diabetes, strokes and cancers.[19] A primary feature of these conditions is that they are controllable through behavioral decisions—but without information, people have almost no chance of learning what these healthy behaviors are.

The beauty of open data technologies is that they are disease-agnostic, making them highly suited to producing transferrable models. Good systems can be expanded or replicated in other health areas, promoting a type of solution-sharing rarely witnessed in large-scale health programs. A national health platform for diabetes became an unlikely ally for Ebola efforts in Senegal, where the adaptability of the technology and stakeholder collaboration allowed 4 million text messages on Ebola prevention to be sent to heavily populated areas in Dakar and St. Louis.[20]

By supporting simple, transferrable technologies that allow community feedback, the aid community will contribute to three key goals: focusing on simple technologies, standardizing open data approaches (especially through replication) and encouraging a more qualitative approach to monitoring and evaluation in aid projects. If this were the sole achievement of DAH for Ebola over the next 18 months, the outbreak's impact on national health systems might have the beginnings of a silver lining.

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[18] Eldstein et al., *Ebola and Future Health Crises: The Role of the G7.*

[19] WHO Noncommunicable disease country profiles: Liberia 2014.

[20] WHO press release 2014: "Government of Senegal Boosts Ebola Awareness through SMS Campaign" http://www.who.int/features/2014/senegal-ebola-sms/en/.

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Policy Recommendations

There are three main opportunities for aid donors to use their influence to change the use of aid data.

The first is in program design. As primary funders, donors have a clear opportunity to shape a program's use of data from the outset by using grant conditionality as an incentive for particular types of data collection, reporting or integration within solutions. This could extend to encouraging the use of real-world data in program design activities such as needs assessments and proposal justifications.

This relates to the second opportunity: standardization. By approving specific data management approaches, donors and aid agencies could promote these as best practices in their programs across all settings. Collaboration with civil society and advocacy groups could further support the establishment of best practices, by putting pressure on governments to establish basic guidelines for protecting health-care data and to ensure the public is aware of safe practices. This will help increase user trust in services that collect or report health data, and begin to develop quality control for data use in projects.

In addition, by working directly with communities and users, donors could identify key concerns that are currently preventing wider participation in open-data health initiatives. Encouraging the adoption of data reporting standards such as the IATI framework would also facilitate data sharing between projects, improving the accuracy of information on the type of aid needed at a local or regional level.

Finally, and perhaps most critically, donor leadership will be vital for determining whether open data can deliver on its promise of greater impact. Design and standardization are fundamental first steps for improving both quantity and quality of development data, but they will not achieve better outcomes on their own. Donors will be the catalyst to ensuring that data are used to shape programs, closing the feedback loop. This could be achieved by using better data to tailor aid programs more closely to community or individual requirements.

While programs focusing on large-scale health impact, such as mass drug administration, have their benefits, open data offers huge potential for reaching the groups that these larger programs miss. These often tend to be vulnerable or marginalized groups, making their support by donors even more critical for achieving Sustainable Development Goal 3, "Ensure healthy lives and promote well-being for all at all ages."[21]

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[21] Sustainable Development Knowledge Platform: https://sustainabledevelopment.un.org/?menu=1300.

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Donors should also use their local networks and relationships to find the best channels for reporting back to communities—and building channels for community members to respond, such as online platforms, open-access discussion forums or designated community spokespeople. Community participation will be a core focus of health aid in the coming years, and there are a number of ways donors could use patient community models from non-aid areas of health—platforms such as PatientsLikeMe or the e-Patient movement—to improve aid program accountability and recipient–donor feedback. This will ensure that health data remain in line with a broader move toward democratic, inclusive development approaches that empower citizens to make their voices heard in policy and practice.

Conclusion

Open data and its associated technologies have a clear role to play in improving aid delivery, by closing the feedback loop between donors and recipients. In the broader context of aid, the data revolution should mean that what comes from communities returns to them, in a cycle of mutual information disclosure and response. Donor agencies need to expand their use of open data to make citizen feedback part of program design and impact assessment. This will increase community trust in foreign aid programs by making recipients feel that the content is directly relevant to their individual situations rather than imposed externally.

To ensure greater impact in the coming years, it is not aid itself that needs to be reinvented, but the use of data in aid programs. Innovation models need to avoid the false dichotomy of seeing programs as either top-down or bottom-up. The design and implementation of aid programs should be a collaborative effort between donors and recipients, using the strengths of each to maximize an intervention's effectiveness. Once again, it is the responsibility of the donor community to standardize this approach, leading by example and using grants to incentivize governments and NGOs to follow suit.

Finally, if there is one technology on which the aid industry should focus over the next five years for achieving all this, it is the mobile phone. Mobile penetration rates across the developing world have soared recently and are continuing to rise.[22] While there are still gaps in access, this leap in mobile phone ownership is a clear opportunity to improve interaction between donors and communities.

Open-access programs can be adapted to support basic text messaging or more advanced smartphone databases and interactive platforms. The technology is widely accepted in most communities, and its application in development has seen a proliferation of successful projects in health, education, agriculture and human rights. The aid industry should not overlook the mobile phone's potential as a data collection tool, but, as this essay has demonstrated, that is not its only potential function. The technology exemplifies the principles of two-way communication on which aid programs should be built in order to

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[22] World Bank, "Mobile Cellular Subscriptions per 100 People."

maximize their impact. Napoleon's ultimate success in battle lay in his talent for mobilizing troops. It is entirely possible that the success of aid in the next 10 years will depend on a different kind of mobilizing.

But regardless of the specific channel, there is one clear message for a productive use of open data in development: Data collection needs to start becoming data communication. In order to sustainably affect outcomes in communities, the data and its outcomes need to be made visible to communities. Like Newton's legendary apple, it is only by coming back down that the impact of the data will be felt.

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