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DISCUSSION PAPER

Emerging Opportunities: Monitoring and Evaluation in a Tech-Enabled World

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Introduction

Greater competition for the limited resources available for international development assistance, combined with the broadening expectations of what development assistance should achieve, has heightened the demand for efficient systems to assess the performance and impact of international development programs. Developing country governments are also increasing their commitment to building systems that can assess the performance of national development plans, as evidenced by a steady growth in the number of developing countries that are implementing national evaluation policies. In addition, as civil society and local organizations gain greater voice, there is a heightened demand to assess the participatory, humanitarian and equity-focused dimensions of development and to include program participants more meaningfully in monitoring and evaluation (M&E) processes. Finally, the growing scope of human-made and natural crises has increased the demand for assessing the impacts of development during crises and in unstable environments.

All of these factors are creating a greater demand for more rigorous – and at the same time more flexible – systems to monitor and evaluate development and humanitarian interventions. Critical assessment of the strengths and limitations of current approaches to M&E has identified serious limitations of many existing approaches for addressing the changing structure of development assistance and the increasingly complex environment in which it operates.

Alongside this wider context, there are two broad sets of historical challenges in conventional M&E approaches. The first set is often referred to as "real-world" or operational challenges, while the second set can be categorized as methodological challenges. Emergent ICT tools and applications may have potential to help address some of the overarching M&E challenges in the wider development space while, at the same time, contributing to overcoming real-world and methodological challenges.

1.1 Real-world challenges

Generally, evaluations and monitoring systems are conducted and created under "real-world" constraints, meaning they operate within a limited budget and have limited access to important data. In addition, they must be designed, implemented, analyzed and disseminated under severe time con-

straints.[1] The following lists some common challenges resulting from real-world constraints.

- The cost of collecting the desired data is too high to be feasible within the approved budget. This means that the sample size has to be reduced or that important qualitative data collection methods which complement the quantitative survey, such as focus groups or in-depth interviews, cannot be included in the evaluation design.
- The range and complexity of potentially relevant data is expanding exponentially through the availability of big data,[2] and the speed and ease of collecting new kinds of data. Most current M&E systems do not have the technical expertise and logistical or financial resources to capture, or utilize all of this data.
- It is difficult and expensive to obtain up-to-date information on how target populations use the services offered by government or development institutions.
- Certain groups are difficult or expensive to reach, such as drug users, sex workers, ethnic minorities, poor households in remote areas or families who have moved from their original addresses. Consequently, they are often excluded or underrepresented in the evaluation.
- When evaluations are conducted in conflict zones or in dangerous communities, it is difficult for interviewers to reach some areas or it is risky for respondents to be seen talking to interviewers. In other cases, cultural constraints make it difficult for women to travel outside their compounds or meet with interviewers.
- Observing how a project is implemented can be just as important as measuring the changes that have taken place over the life of the project (the conventional pre-test-post-test comparison). However, observing the implementation process is time-consuming, expensive and complicated, and is often excluded from the evaluation.
- Development programs are affected by the economic, political, socio-cultural, demographic and ecological/environmental contexts within which they operate. However, due to the costs and complexity of collecting information on these contextual factors, they are often not systematically incorporated into the evaluation design.
- Finally, validity of the evaluation findings depends in large part on the quality of the data collected. Unfortunately, data quality control is such an expensive and time-consuming process that, when working under budget and time constraints, it may not be possible to follow standard quality control procedures, such as checking to ensure the right subjects have been selected and interviewed, or ensuring that questions are asked correctly, in the right order and with the correct follow-ups.

1.2 Methodological challenges

In addition to real world constraints, methodological challenges impact on the quality and timeliness of evaluation exercises. The list below identifies some examples of these challenges.

- Most widely-used M&E systems were designed to study relatively stable programs, with a well-defined set of outcomes that were expected to be achieved through fairly simple causal paths. However, today, many development agencies are moving towards multi-donor programs, with

[1] There are two kinds of time constraints. The first refers to the time period during which the evaluation must be conducted. For example, the terms may stipulate that the evaluation must be designed, implemented, analyzed and the report presented within a certain number of weeks, and the evaluator may feel this does not allow sufficient time. The second refers to the stage of the project at which the evaluation is conducted. For administrative reasons, many evaluations that are intended to assess project impacts are conducted at a point in the project when it is still too early to assess impacts.

[2] "Big data" is an umbrella term that refers to one or more of three trends: i) the volume of digital data generated daily as a by-product of people's use of digital devices is growing; ii) new technology, tools and methods are available to analyze large data sets that were not specifically created for the purpose of analytics; and iii) policy-making insights are being extracted from these data and tools. Section 3 of this paper expands on the role of big data in M&E.

multiple and often changing interventions, and responsibility for the programs and management of resources is increasingly moving to host-country agencies. Thus, it is recognized that conventional evaluation designs that work for "simple" or "complicated" programs no longer work for the emerging complex programs that must be implemented in fast-changing environments that face factors such as climate change, ongoing conflict, and weak or failing states. This new focus on complexity also recognizes the interconnectedness of programs being evaluated with other features of the country or the international environment. Complexity is a challenge that the evaluation community is only starting to address (Box 1 provides a brief definition of the concepts of "simple", "complicated" and "complex" programs.)

- Programs intended to produce behavioral change, such as reducing high-risk sexual

BOX 1

Defining simple projects, complicated programs and complex interventions

Simple projects:

- include relatively simple "blue-print" designs that produce a standardized product
- follow a causal path that is relatively linear
- have defined start and end dates making it time-bound
- have only a few objectives but they are clearly defined
- define a target population that is usually relatively small
- have a well defined budget and resources.

Complicated programs:

- include a number of different projects each with its own "blueprint"
- follow causal paths for different components and different objectives, but are still relatively linear
- have information on the process of project implementation that is often not well documented
- target a larger and more diverse population
- involve several different donors and national agencies
- may be implemented by different donors in slightly different ways
- set objectives in broader and less clearly defined terms
- set up without start-end dates, thus not so time-bound
- focus on the importance of program context
- merge funds into ministry budgets, making it difficult to estimate.

Complex interventions:

- merge into national or sector development policy, making specific program interventions difficult to identify
- follow non-linear causal paths, as there may be multiple paths to achieve an outcome, or the same set of inputs may produce different outcomes in different settings
- are delivered by multiple agencies, and components and service are not delivered in a uniform manner
- have emergent designs that evolve over time
- have program objectives that are difficult to define or not specified
- have non-proportional relationships between inputs and outcomes.

SOURCE: Adapted from Bamberger *et al.*, 2012.

NOTE: the listed items are examples of how these are often set up. Not all projects will contain all of these elements.

behavior or improving public service agencies, often interact with vulnerable and socially marginalized groups. In other cases, behavioral change processes influence intended outcomes that the program cannot predict or control, such as how interactions among members of the target population affect program implementation. As these responses are often unintended, it is difficult to track or even to identify them with conventional evaluation data collection methods.

- Theories of change (ToCs) are increasingly used in evaluation design. These are difficult to develop and update in a participatory way when there are multiple stakeholders based in widely dispersed geographical locations. Consequently many TOCs become rapidly outdated or do not have mechanisms to incorporate new information or changing contexts. TOCs make it possible to constantly test and revise the assumptions built into the model and the assumed linkages between different levels of the model. Yet most evaluations do not have the capacity to constantly update the TOC and, as they become outdated, they fail to make their potential contribution to the implementation and interpretation of the evaluation.
- Quantitatively oriented evaluations (e.g. randomized control trials and survey-based designs in general) find it difficult to collect qualitative data such as leadership styles and patterns of interaction among household members. The attempt to measure these complicated or complex[3] multi-dimensional phenomena through a small number of simple quantitative indicators can result in the problem of construct validity.[4]
- Programs may operate in insecure locations such as militarized areas and places with high crime or gang activity. These sites may be dangerous for evaluators to visit. Other areas may be geographically isolated or otherwise difficult to reach, making it too expensive to capture information about them using conventional data collection tools.
- Most programs are affected by broader contextual changes such as population movements, climate change, the condition of transport networks and soil erosion. These are also difficult to capture through traditional evaluation methods.

Evaluators and practitioners are experimenting with ICTs to include the voices of participants and beneficiaries of development programs ...

- The focus of development is shifting towards complex, multi-component, multi-agency programs with a range of difficult-to-document interventions that can reach into the hundreds. These programs also have a wide range of outcomes that are often not clearly defined. With conventional evaluation designs unable to assess the complex interventions, the evaluation community is searching for new methodologies for evaluating complex programs.
- Evaluation designs continue to struggle with the challenges of: i) internal validity, or reasons why an inference about a causal relationship between two variables – e.g. a project intervention and an observed outcome – may not be

[3] The evaluation literature distinguishes between simple, complicated and complex interventions and simple, complicated or complex evaluations. A complex intervention is characterized as having multiple components that can produce multiple outcomes through multiple, and usually non-linear causal pathways, where relations between causes and effects (inputs and outcomes) are non-proportional (small changes in inputs can produce large changes in outcomes and vice versa). Outcomes may not be known in advance and the program design may be emergent (i.e. it evolves and does not always follow a predictable path). In contrast, a complicated program or intervention has multiple partners, multiple components that are often not implemented in a standard way, not clearly defined, and do not have uniform implementation procedures (each agency may follow a different path). However, the causal pathways are relatively linear.

[4] "Construct validity" refers to the different reasons why the constructs used to measure inputs, processes, outcomes and impacts may not be appropriate.

Table 1: Potential applications of ICTs to address common real-world budget, time and data challenges

CHALLENGE	PROMISING ICT APPROACHES
Data collection costs are high	Collecting and analyzing survey data through smart phones and hand-held devices can eliminate costs of printing and transporting survey instruments, and dramatically reduce costs of data analysis. Managing M&E processes and enumerators using software can cut costs and improve efficiency. Collecting mobile data can enable errors to be caught at the point of contact and lower the need to return to re-collect data. Collecting digital data eliminates the need for double data entry.
Real-time information on service use by the target population is hard to obtain	Smart phones can monitor whether clients follow-up on automated phone messages. Smart phones allow for review of application data to understand a "user's journey" through the application and how he or she is using the application. Users of a service can provide input directly via SMS when it is most convenient for them, which may be more convenient than finding time to join focus groups or be interviewed and surveyed according to others' schedules and time frames.
Some groups are difficult to reach	SMS-based surveys can be used to reach out and collect data. SMS is one of the most wide-spread "lowest common denominator" technologies available.
Some groups are dangerous to reach and interview	SMS-based surveys and self-reporting tools via the web can reduce risk to evaluators and those they are interviewing. Phone interviews can be done in areas that are insecure. Incident reporting via phone and Internet allows for more widespread input and self-reporting.
The process of project implementation is difficult to monitor	Smart phones can record video and audio during project implementation activities such as meetings, work groups or classroom activities. Web-based M&E platforms allow for better documentation of processes as well as outputs and outcomes.
Data collection on contextual factors that affect program outcomes is difficult and expensive	Smart phones and Internet enable integrated access to secondary data sources. Big data provides access to more extensive contextual data.
Quality control of data collection is expensive to ensure	GPS-enabled devices can check that the interviewer is in the correct location. Electronic versions of surveys can ensure that questions are asked in the correct order and can include automatic consistency checks. Audio recording can be randomly activated so that the supervisor can listen to the interview. Video can record body language used during an interview or survey, which enables evaluators to understand more. Hand-held devices provide real-time feedback so that errors can be identified and corrected before the interviewer/enumerator leaves the site.
Behavioral change needs monitoring	Video and audio recordings at project locations, in the community or in households improve capacity to monitor behavior directly. Socio-metric analysis of patterns of interaction and communication can be conducted in the community or organization.

Table 2: Potential applications of ICTs to address common methodological challenges

CHALLENGE	PROMISING ICT APPROACHES
Theory of change is needed for multiple, dispersed stakeholders	Online theory of change software permits people in different locations to participate in the design and updating of the TOC. Some tools automatically change text boxes into photos when working with communities with low literacy.
Quantitative evaluation designs need to incorporate qualitative data	Online software permits video and audio data captured on cell phones to be coded. Online software can allow respondents to classify statements and concepts using their own criteria.
Geographic dimensions of programs need capturing	GPS-enabled devices can be used to construct maps locating events, services and important features of the community or area.
Broader contextual factors affecting program outcomes need capturing	Satellite images can track physical change over large areas, such as population movements, rainfall patterns, location and size of settlements, effects of climate change, and location and quality of infrastructure. Crowdsourcing can provide real-time feedback on damage from natural disasters, ongoing and planned political protests and outbreaks of disease.
Complex programs* require development of specifically targeted evaluation applications	Applications can integrate multiple data monitoring sources of social media communications, enabling the study of attitudinal and behavioral change. ICT can allow for modeling of complex systems and causal pathways. ICT can assist in the development and configuration of case study analysis. Software permits the development of scales and indices (such as concept mapping) that define and rate complex concepts.
Data silos need to be reduced	ICTs can help move organizations towards common data definitions (e.g. numbering systems for regions, districts, health centers, water points, communities and commonly defined indicators across programs. Use of a management information system can eliminate the need to re-collect data over and over again.

* Some of these potential applications are still work in progress and have not yet been widely tested or documented.

valid, and ii) external validity, or reasons why inferences about how evaluation findings would hold in other settings may not be valid. Well designed quantitative evaluations can usually address the internal validity issue, but they have difficulty in addressing external validity. Thus, there is an increasing use of mixed-method designs because their careful combination of quantitative and qualitative methods can provide more reliable estimates of both internal and external validity.

ICTs are being used to help bring M&E up to speed with the changing external environment and to address some of the real-world and methodological challenges mentioned above. Evaluators and practitioners are experimenting with ICTs to include the voices of participants and beneficiaries of development programs, allowing them to weigh in on what success should look like and make possible a more realistic evaluation of whether or not success has been achieved. Evaluation teams are using ICTs to help improve efficiency and quality of data, and to reduce sample bias. They do this by providing access to better data to construct the sample frame, reaching vulnerable and difficult-to-reach groups that are frequently under-represented, and improving quality control of the interview process.

Large data sets and improved data processing capacities are allowing researchers and evaluators to identify formerly unseen patterns that require further investigation. ICTs are also playing a role in enabling wider sharing and discussion of evaluative knowledge which, in turn, helps development practitioners avoid repeating mistakes and failures. It also allows dissemination of evaluative knowledge to a wide audience, outside of boardrooms and program teams, in order to stimulate broad discussion and learning. New technologies are also being used to facilitate training of developing country evaluators, helping to build capacity and knowledge that will enable local evaluators and institutions to play stronger roles in the evaluation process in their own countries (Rodin and MacPherson, 2012).

Much of the attention around ICTs in M&E focuses on enhancing the participation of program participants in feedback loops that seek to improve transparency and accountability in aid and development or government service programs. ICTs are being used to increase voice and participation throughout the program cycle – from diagnosis, through planning and implementation, to evaluation and the dissemination of evaluative knowledge. Gathering a wider perspective from a broad network, learning from experimentation through results testing, setting up and learning from lessons and feedback loops, and having the ability to capture the value of both successes and failures have been identified as key elements of organizations with strong capacity to innovate. ICTs can play a role in facilitating these capacities within organizations (The Rockefeller Foundation, nd). This is especially important as development programs and their accompanying evaluations are increasingly understood to be complex systems.


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Table 1 lists some of the promising approaches that are discussed in this paper. While some of the approaches are already well documented, others are included as new areas to explore.

2

Information and communication technologies in the M&E cycle

New ICTs impact virtually every aspect of people's lives across the globe. A 40 percent rise in mobile broadband subscriptions was seen at the global level in 2011, access to and use of affordable tablets and other devices is growing steadily, and the International Telecommunications Union (ITU) reported that growth in ICT uptake in 2012 was almost universal. Mobile cellular subscriptions had reached almost 7 billion by the end of 2013, with mobile network coverage expanding to more and more remote areas (ITU, 2013a; 2013b). Those working in international development are devising a myriad of ways to take advantage of this growth in ICT access and use. Incorporation of ICTs into development work, a field known as ICT for Development (ICT4D), is expanding and changing at the same rapid pace as technology itself.

ICTs came to the forefront in the 1960s, when the public sector began using information technology systems to support administrative functioning. In the 1980s, multinational corporations began seeing computers as tools that could deliver economic growth in the private sector. In the 1990s, which saw the uptake of the Internet and launch of the Millennium Development Goals (MDGs), people began thinking about how ICTs might be used for development efforts. By the year 2000, the integration of ICTs into development programs had become commonplace. Into this environment arrived the cellular phone, offering unprecedented opportunity because of its widespread use and adoption even in poor communities. Its rapid uptake around the world renewed emphasis on ICT4D.

> *Increasingly, ICTs are enabling improved feedback and participation from the populations that development agencies serve.*

As development theories have advanced, the field of ICT4D has also moved forward. Today, ICT4D often places emphasis on participation, improvisation, flexibility, learning and local capacity. The successful ICT4D initiatives are not developed for the poor in a laboratory. Rather, they are designed together with the poor or designed directly by the poor, within poor communities as they innovate on their own with new technologies (Heeks, 2009).

ICTs are found throughout the development process and in every area of development work. They support development organizations in improving their infor-

BOX 2

The potential of ICTs in the M&E cycle

Diagnosis. ICTs help bring new voices and broader participation into program diagnosis and enable a wider range of inputs at a reduced cost. They enable evaluators to better manage and pull possible trends out of large data sets.

Planning. ICTs can help achieve greater inclusion in planning processes. New technologies make it easier to compare and visualize data sets and to analyze data based on location so that resources can be better allocated. Data can also be aggregated more quickly and shared at various levels to improve participation in the planning process and support better decisions. New software tools can enhance the development and management of theories of change.

Implementation and monitoring. ICTs allow for the collection of real-time data on participant experiences, behaviors and attitudes, meaning that analysis can be conducted early on in the process and course corrections can be made to improve interventions and outcomes. Direct feedback from program participants is also possible through new ICTs, which can allow for greater transparency and accountability.

Evaluation. ICTs can increase the voice of vulnerable and underrepresented groups and broaden the types and volume of data that can be collected, combined, compared and analyzed. New technologies may be able to help overcome challenges and constraints such as sample bias and poor data quality, and they can improve the understanding of complex sets of behavior and data.

Reporting, sharing and learning. ICTs enable wider circulation of evaluative learning, interactive sharing and greater public engagement with evaluation findings.

mation management, public outreach, advocacy, influence and fundraising. ICTs are also used directly in programs, where they help people access information, markets, healthcare, financial services and education. They enable community members to connect with friends and family, and to augment their overall participation in the development process. Increasingly, ICTs are enabling improved feedback and participation from the populations that development agencies serve.

Those who were previously unheard in discussions about development are starting to use devices, software and platforms such as the Internet and mobile phones to enter into development debates and make themselves heard. ICTs have spurred innovative approaches to data collection, new combinations and comparisons of data and information, and faster data processing that facilitates better planning

and decision-making. The widespread availability of mobile devices means that information can be submitted from or collected in places that were difficult to reach in the past. In addition, people can share and communicate in new ways through these tools.

Earlier in this paper we discussed the broad context in which M&E is operating, the real-world and methodological challenges facing current M&E systems, and the difficulties of adapting traditional M&E approaches to a rapidly changing and increasingly complex international development scenario. While ICTs cannot single-handedly resolve all of the challenges listed above, there are some tools that can be used throughout the planning, monitoring and evaluation cycles to help overcome limitations in conventional M&E methods.

Despite a surge in activity in the area of ICT-enabled M&E, many evaluators still use traditional methods and approaches. While there are certainly cases where traditional data collection methods are most appropriate and ICTs create their own set of new challenges (as we will discuss in Chapter 5), an investment in the development, application and evaluation of innovative new M&E methods that include creative uses of ICTs could help organizations adapt their approaches throughout the entire program cycle, making them more flexible and adjusted to the complex environments in which development initiatives and M&E take place.

6

A checklist for thinking through ICTS in M&E

The pros and cons of integrating ICTs into M&E processes are quite balanced and, with careful thought and planning, ICTs can be used with success. Here, we provide a checklist to help evaluators begin thinking about how they might include ICTs in their M&E design.

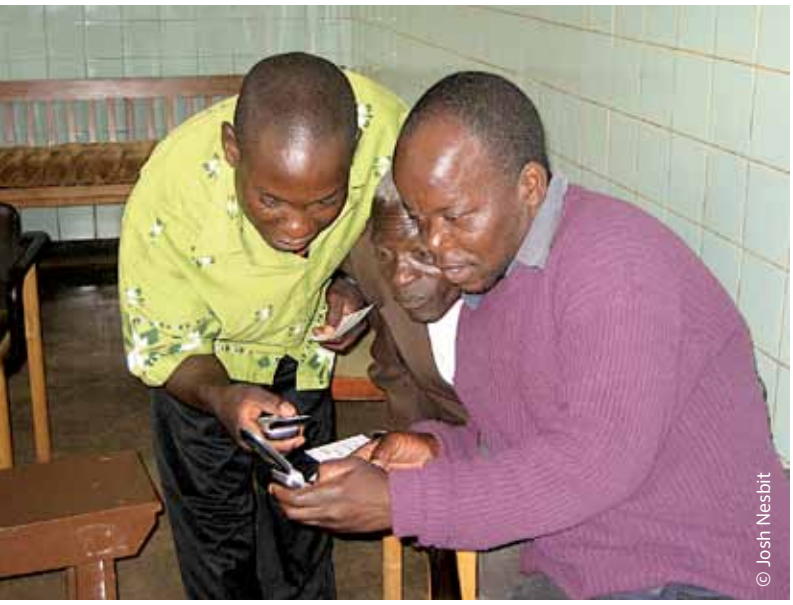
1. Develop a quality M&E plan

Adding new technologies to poorly designed monitoring and evaluation plans will not be of much benefit. However, a well-crafted M&E plan might benefit from the addition of ICTs, especially if the ICTs and the M&E plan are integrated from the very start of the initiative. Having a clearly articulated theory of change can provide guidance on what information to collect (with or without ICTs) and how it should be interpreted. Clarity as to the level and type of M&E that will be conducted can help identify the right kinds of ICTs to consider: Are you monitoring a project, a program or a wider initiative? Are you monitoring service delivery or influence? Are you more concerned with quantitative data or qualitative data or a combination of the two? What evaluation methodology will you be using?

2. Ensure design validity[20]

When designing evaluative processes with ICTs, it is important to be aware of the categories used to judge strengths and weaknesses of evaluation design, analysis and interpretation. The four categories that judge validity include: i) internal design validity: reasons why conclusions about the cause and effect relationship between two variables may not be correct, ii) statistical conclusion validity: reasons why conclusions about the statistical association between inputs and outcomes/impacts may not be correct, iii) construct validity: reasons why the constructs used to measure inputs, processes, outcomes and impacts may not be appropriate (e.g. income may not be a good construct to assess household wealth), and iv) external validity: reasons why assumptions about how generalizable findings from a pilot project are to different contexts may not be correct.

[20] Bamberger *et al.* (2012) RealWorld Evaluation has a chapter on assessing the validity of evaluations and several appendices with checklists that can be used to assess the validity of a particular evaluation.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3. Determine whether and how new ICTs can add value to an M&E plan

Although it is common to start with the technology and ask what can be done with it, one should start with the M&E plan and ask where new ICTs can add value or help improve the design, who the different stakeholders are in the M&E process, and what type of ICT would be most useful. In addition, the fact that more data can be collected more quickly through the use of ICTs does not mean that all the data will be of use. Organizational capacity is needed to analyze data as is the will to use the data for adapting and modifying program approaches according to what is learned.

4. Select or assemble the right combination of ICT and M&E tools

No single ICT or M&E tool is likely to offer everything that an organization or evaluator is looking for. In addition, most M&E specialists do not know what questions to ask when trying to find the right ICT tools. Hidden costs, technical support and training needs must be worked out in order to determine whether the return on investment makes integration of ICTs worthwhile. If the M&E goals are clear, a number of applications, tools and devices can be used to collect different types of information that feed into the overall process. Creating brand new, bespoke tools and applications for a specific M&E process may not be advisable, given the range of available applications. It might be best to consider systems that gather data in common formats that are easily shared, have available support for ongoing maintenance and conform to open data standards. However open source also requires resources and the capacity to adapt it to an organization's needs.

5. Adapt and test the process with different audiences and stakeholders

The right combination of ICT and traditional tools will depend on who will collect the data and who will use the data. Understanding the context, connectivity and capacity of these different audiences is critical during development of the ICT-enabled M&E process. Testing tools and data collection early in the process with a group of users can help identify areas where adjustments to tools, applications and processes are needed before conducting large-scale data collection or roll-out. As part of this process, keeping in mind the questions: "M&E for whom?" and "M&E for what?" can help ensure that the data collected meets the needs of the various stakeholders, whether they are donors, community members, program managers, government, or a combination of these and others.

6. Be aware of differing levels of access and inclusion

One of the premises of including ICTs in the M&E process is that they can help expand access and promote greater inclusion for the most marginalized members of the community. However, challenges, such as irregular access to electricity, poor connectivity, the cost of devices and providing content in local languages, mean that inclusion is not a given. As with any kind of community process, a key consideration is how to manage power dynamics and ensure that everyone has an equal chance to participate and provide input. Combinations of M&E tools and channels should consider local context, levels of access and network coverage of those collecting

and using the data. Context assessments should also include an understanding of how and whether communities use different kinds of ICTs (e.g. is voice or SMS preferable if relying on mobile phones), the languages and scripts that are available on different devices, which sources of information different groups within the community trust, and cultural concerns such as attitudes about women and girls' use of technology (Walker Hudson, 2013).

Smart phones may allow already powerful members of society to increase their power.

7. Understand motivation to participate in M&E activities

Motivation and incentive can impact the timeliness and quality of data collected during monitoring and evaluation. When data are being collected from community members, it is important to develop ways to feed the data back to them so that the data collection process will not be only "extractive". The same is true for frontline staff who are expected to provide M&E data. Opening ownership and sharing M&E data so that different stakeholders can use it for decision-making can help improve responsiveness, but privacy and risk need to be analyzed first. When broadening the M&E process and using approaches such as SMS reporting and voluntary "crowdsourced" input, a good understanding of motivation is critical. As found in one 2012 study, participant motivation, not technology, is the biggest constraint to effective crowdsourcing (Findley *et al*., 2012).

8. Ensure privacy and protection

The range of new tools available for data collection is wide, but those collecting data may not be aware of new privacy and security risks that come with them. Little documentation is currently available for those wishing to improve their understanding of the potential risks with ICT-enabled approaches to M&E. Yet, maintaining secure databases and taking care that digital data is protected is extremely important, especially when working with vulnerable populations, or in situations where corruption may be present or where conflict could be exacerbated by the M&E process. Having very clear and updated informed consent processes in place is critical.

9. Try to identify potential unintended consequences

In the push to promote innovation and ICTs, advocates promoting the benefits of emerging technologies tend to ignore the potential for unintended consequences that can result from introduction or use of ICTs. Domestic violence has been shown to increase in some cases when women are given mobile phones and men fear that they may use them to develop relationships with other men (Kutoma, 2010). Smart phones may allow already powerful members of society to increase their power (Stahl *et al*., 2010). Involving local staff and communities in an assessment of potential risks and keeping a close eye on what is happening outside the actual M&E work is critical for identifying potential unintended consequences and addressing them quickly if they happen.

10. Build local capacity

Often ICT-enabled initiatives focus on top-down, externally created "solutions" rather than building on local systems and processes, or working with local partners. Increasing the participation and improving the capacity of local evaluators and local partners is needed for high quality, sustainable M&E. In addition to finding and supporting local partners, capacity can be enhanced through video and online courses for evaluators, and social media platforms can be used to help local evaluators connect and share good practice, learning, failures and materials. Again, these tools will only be useful if they are accessible and tailored to the context of evaluators.

11. Measure what matters

Results-based, data-based focuses can be biased towards the "countable" and leave out the complex-

ity and in-depth analysis made possible through collection of qualitative information. Many of the most common ICT tools used for M&E are designed to collect increasingly larger amounts of quantitative data. However efforts should be made to ensure that the M&E process also includes qualitative feedback where indicated.

Social media platforms can play a big role in engaging practitioners with evaluation results and in helping evaluators understand practitioner experiences.

12. Use and share M&E information effectively

Data visualizations during monitoring can be of enormous support in making decisions about program modifications and budget allocation, but it is important to ensure that data visualizations are not a goal. Rather, use of data to support decision-making is the important part. Real-time data and dashboards that allow program managers to keep up-to-date on progress are possible with new ICTs, yet these need to be accompanied by appropriate decision-making channels and authority levels. Sharing evaluation results can be of great value to organizations and the wider field of development, and social media platforms can play a big role in engaging practitioners with evaluation results and in helping evaluators understand practitioner experiences. It is important to think through and map out the different levels of data that will be collected – from mobile phone to crowdsourced or self-reported data, to an MIS, to a dashboard, to social media – and how existing data can be linked to other existing datasets. Without this, time and resources will be wasted collecting data that are similar, but not very useable by colleagues and partners.