**A R T I C L E**

# Monitoring the SDGs: Digital and Social Technologies to Ensure Citizen Participation, Inclusiveness and Transparency

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## Abstract

**Motivation:** The article shows that the measurement of SDG attainment remains vague and incomplete and argues that participation-based and inclusive monitoring must be an integral part of managing the SDG implementation process.

**Purpose:** Countries are supposed to review their progress of SDG implementation every four years, but the method of reviewing is left open. In addition, and even more urgent is the need to improve on the inadequate definition of monitoring methods that countries are supposed to deploy.

**Approach and methods:** The article reviews the various options currently available to conduct the four-year review and the methods of on-going SDG monitoring.

**Findings:** The analysis shows that the SDG monitoring methods have not yet been defined, leaving stakeholders (governments, business and civil society) without appropriate guidance.

**Policy implications:** The authors propose two types of monitoring: micro-monitoring and macro-monitoring, both of which are necessary to ensure effective and efficient monitoring in achieving process accountability, institutional learning, and innovation.

**K E Y W O R D S**

Inclusiveness and transparency, innovation, institutional learning, monitoring SDGs, SDG indicators, SDG review methods

## 1  |  OBJECTIVES OF THIS ARTICLE

The first periodic review of the Sustainable Development Goals (SDGs) was scheduled for 2019. There is as yet no consensus on how the review should be organized and the methods to be used. The term 'review' was chosen to avoid anxieties about and resistance to the term "evaluation", which partially explains the lack of commitment to more stringent definitions of monitoring and review (M&R) methodologies. Following discussions at the United Nations (UN) and in many other forums on the review process, the authors noticed a conflation of terms. There are mentions of reviewing,

monitoring and reporting, but monitoring often turns out to be a mini-review rather than a separate process of assessing implementation on a continuous basis. Monitoring is not supposed to be used to collect data only for reviews nor for evaluations by experts and governments' statistical authorities.

Monitoring is an ongoing process that parallels, tracks and traces day-to-day decisions and actions. Evaluation is an 'end of the pipe' activity, seeking to assess and judge against set criteria the validity of any decision or action. With respect to the SDGs, the authors propose using multiple sources of data for both monitoring and evaluation (M&E) processes, to integrate the use of new Information, Communication and Technology (ICT) methods and tools with the implementation of the SDGs, and to augment "data analysis" through a reform of the statistical capacity of global institutions as well as of that of the national authorities. There needs to be a "common" communication template so that data can be compared across national and subnational boundaries.

The conflation of M&R for the SDGs prevents pragmatic discussions needed to "design and build" a viable monitoring and accountability process and to put the three principles of the SDGs into practice—M&R through participation, inclusiveness and transparency rather than reverting back to expert-driven big data analytics, hidden government censorship of the results of M&R analyses, and exclusion of citizens from true participation in monitoring their countries' SDGs rather than being assigned to occasional public hearings. Citizens can participate in the monitoring process since monitoring based on participation does not require sophisticated data analytics.

Thus, this article focuses on the need for a monitoring system for the SDGs to be fully developed and operationalized independently of the formal SDG review process. Data emerging through monitoring can be useful for the review process but, if based on civic participation, is a social technology offering citizens' inputs and assessments of a country's implementation progress, and hence is more than a retroactive revisiting of past events typical of evaluations and reviews.

Monitoring understood as participation is a social technology that differs from traditional quantitative data collection of past events through evaluation. Monitoring is an assessment of current progress and provides crucial opportunities for proposing remedial action in regard to a country's SDG implementation priorities and strategies. Such proactive and participatory monitoring can produce data that could be included in reviews but should be understood as an opportunity for co-development of a country's SDG strategy and hence should be seen as complementary but not subservient to the review process.

As part of the ongoing SDG discussion, both "monitoring" and "reviewing" processes need to be re-assessed as innovations in data-collection techniques, analytic tools and data storage continue to evolve. The same is true concerning citizens' expectations of transparency, inclusiveness and democratic participation. There should be a clear mechanism to ascertain how countries can be held accountable in regard to the implementation of the SDGs. There are various formats that countries could use to report their current state of SDG implementation. This article offers a number of options to make M&R more productive, constructive and aligned to the intentions of the SDGs.

## 2 | THE CONTEXT—SDGS AND THEIR TRANSFORMATIVE AGENDA

The United Nations General Assembly adopted Resolution 70/1, titled *Transforming our world: the 2030 Agenda for Sustainable Development* in September 2015. Resolution 70/1 introduced the 17 SDGs, created with the aim to "end poverty, protect the planet, and ensure prosperity for all" (United Nations, 2017b). The 17 goals encompass all aspects of sustainable development, including ending

poverty and hunger, ensuring quality education and gender equality, reducing inequalities and ensuring sustainable business practices, and taking care of the environment (Yiu & Saner, 2014).

The 17 SDGs drew on a large number of previous international agreements, especially concerning development, the environment and human rights (Saner, Yiu, & Kingombe, 2019). The Goals are presented as "integrated and indivisible, global in nature and universally applicable" and reflecting a common concern for people (broadly corresponding to Goals 1–5), planet (6, 12, 13, 14 and 15), prosperity (7–11), peace (16), and partnership (17).

As part of Resolution 70/1, countries also agreed to review their progress on a voluntary basis. The questions to include in such a review are: How to collect data? What kind of data? For whom and within what timeframe?

# 3 | MEASURING PROGRESS

The first step taken towards achievement of the 17 SDGs was to define specific targets for each general goal. Altogether, 169 targets were identified and adopted at the same time as the SDGs. These targets were broken down further into 232 measurable indicators for data gathering and for measuring distance to the relevant Goal. Targets were based on the principle of 'SMART', i.e. specific, measurable (though some targets should remain fairly general and may require the setting of national/local targets or new metrics), attainable (though some will be "stretch" goals that can be attained only with considerable effort), relevant (to the four dimensions of sustainable development), and time-bound to 2030 or earlier (United Nations Sustainable Development Solution Network, 2014).

> Indicators to measure reaching of the targets will be the backbone of monitoring progress towards the SDGs at the local, national, regional, and global levels. A sound indicator framework will turn the SDGs and their targets into a management tool to help countries develop implementation strategies and allocate resources accordingly, as well as a report card to measure progress towards sustainable development and help ensure the accountability of all stakeholders for achieving the SDGs (United Nations Sustainable Development Knowledge Platform, 2015).

An example of a target could be, for example, Goal 2, which stipulates "End hunger, achieve food security and improved nutrition and promote sustainable agriculture", i.e. Zero Hunger. SDG 2 comprises five targets. Target 2.1, for example, reads: "by 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round" (United Nations, 2017b). The SDG targets provide concrete performance expectations all the way to 2030.

It is not only important to have specific objectives, however, but it is also imperative to have concrete ways of following the progress towards achieving them. To this end, the UN introduced the indicators for the SDGs. Each target has indicators which track countries' progress in reaching the targets. For example, one of the indicators for target 2.1 is indicator 2.1.1, the "prevalence of undernourishment" (United Nations Statistics Division, n.d.). The indicators provide the framework for measuring how far we have come and how much more we have to do, although these are still being developed. As such, the UN has created a classification system to sort the indicators by completeness. According to the Inter-agency and

**TABLE 1** SDG indicator classifications—Tier I, II and III indicators

| Tier | Definition | No. of Indicators | Percentage |
| --- | --- | --- | --- |
| Tier I | Indicator is conceptually clear, has an internationally established methodology and standards are available, and data are regularly produced by at least 50% of countries and of the population in every region where the indicator is relevant. | 82 | 35.3% |
| Tier II | Indicator is conceptually clear, has an internationally established methodology and standards are available, but data are not regularly produced by countries. | 61 | 26.2% |
| Tier III | No internationally established methodology or standards are yet available for the indicator, but methodology/standards are being (or will be) developed or tested. | 84 | 36.2% |
| Multiple Tiers | Different components of the indicator are classified into different tiers. | 5 | 2% |

*Source:* Tier Classification for Global SDG Indicators (IAEG-SDGs, 2017, p. 3).

Expert Group on SDG Indicators (IAEG-SDGs, 2017), there are Tier I, II and III indicators (see Table 1), making up 232 indicators in total (United Nations Statistics Division, 2018).

The large number of Tier III indicators presents a great challenge for the proper and timely implementation of the SDGs, as these criteria are ill-defined and difficult for countries to use for measurement. The indicators provide the guidelines for tracking the progress towards meeting the SDGs, and their lingering incompleteness nearly three years into the programme represents one of the few shortcomings of the 2030 Agenda. Without definitive indicators, it is nearly impossible for countries to assess whether their actions to reach the SDGs are effective. A case in point is the 2017 Asia and the Pacific SDG Progress Report published by UNESCAP (2018). A major limitation stated in the report is that only 25% of official SDG indicators could be used for progress evaluation. Thus, progress was only tracked across 66 indicators (60 official SDG indicators and six proxy indicators).

# 4 | APPROACHES TO TRACKING PROGRESS

There are different possible ways to measure the progress of SDG implementation. These include evaluation and review at pre-determined milestones or at the end of the project, or monitoring, which takes a more continuous approach to facilitate transparency and the active collection of data. Within these, there are different possible approaches based on the contexts of the projects and their specifics. This section discusses R&M as practices for measuring progress in greater detail and provides examples currently in use.

## 4.1 | Methods of Observation: Review

As stated above, the indicators have an important role to play as guidelines for facilitating the collection of data related to the implementation of the SDGs. But the indicators are only helpful if actual data are being produced relating to SDG targets and country-specific conditions. There should be a clear mechanism to ascertain how governments can be held accountable in regard to the implementation

of the SDGs. There are various formats that countries could use to report their current state of SDG implementation along with past and future trends.

The first and most common method for countries to inform on their progress is through periodic reviews and reporting. The indicators were created for this review and follow-up process. This mechanism generally functions as an evaluation through self-reporting and review bodies. In the case of the SDGs, reviews would seek to compare national and local data for specific targets and indicators to the global or national SDG objectives in order to compare with best practices and hence track progress. In addition, some review mechanisms have an element of peer review, in which other nations, international organizations, and/or civil society organizations (CSOs), non-government organizations (NGOs) and other groups can pose questions to a country's government about its practices and future plans. Review can also be a mechanism to identify and share best practices and challenges faced in a collaborative environment. This interactivity, when applied, can be one benefit of the review mechanism, though it can easily lead to political challenges and disruptions.

There are different review methods that countries can consider adopting and adapting for their own national SDG review process, such as the Trade Policy Review Mechanism (TPRM), the Universal Periodic Review of Human Rights (UPR), the African Peer Review Mechanism (APRM), the International Labour Organization (ILO) complaint procedure, the Organisation for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises (MNEs). The three most frequently mentioned review methods are listed in Table 2.

The three review methods given as examples have their own structure and process and entail different degrees of involvement of the reviewed country. One important difference between the three well-established review methods mentioned above is the involvement of civil society. Only the UPR includes a regular and structured involvement of CSOs. The other two review methods could involve NGOs but only if a reviewed country agrees to such participation by civil society.

**TABLE 2** Noteworthy review methods used by international organizations

| Organization | Review Mechanism | Practice | CSO Participation |
|---|---|---|---|
| World Trade Organization (WTO) | Trade Policy Review Mechanism (TPRM) | Description of practices, discussion of objectives, peer evaluation of policies. | No participation during official TPRM in Geneva. Countries being reviewed could nevertheless opt to inform CSOs and Business during a post-TPRM hearing. |
| United Nations Human Rights Council | Universal Periodic Review (UPR) | Peer review of states' human rights policies for all UN Member States. | CSO/NGOs are invited to participate, and a select group of NGOs have the opportunity to put questions to the country being reviewed during the UPR in Geneva. |
| African Union | African Peer Review Mechanism (APRM) | Self-assessment questionnaire, country visits from review teams, detailed draft reports to encourage political and economic values. | The APRM mission meets national stakeholders in the capital and provinces (CSOs, Business, local governments and professional organizations). Participation of CSOs is by invitation of the mission only. |

*Source:* The authors.

The current review mechanism for the SDGs at the global level is the Voluntary National Review (VNR). The VNR is part of the United Nations High-level Political Forum (HLPF), the structure responsible for assessing countries' progress and the challenges they face in implementing the SDGs (Together 2030, 2017, p. 2). In these reviews, member countries voluntarily submit reports to the HLPF in New York concerning their activities towards implementing the SDGs. For 2017, 46 countries volunteered to present their reviews. Voluntary National Reviews are considered a key component of the functioning of the HLPF (Together 2030, 2017, p. 2). The General Assembly Resolution and the Addis Ababa Action Agenda (AAAA) both outline the importance of a "robust, voluntary, effective, participatory, transparent and integrated follow-up and review framework" (General Assembly Resolution 70/1, 2015, Article 72). It should be based on a number of principles, one of which is to "maintain a longer-term orientation" (General Assembly Resolution 70/1, 2015, Article 74). Both the Resolution and the AAAA state that the Goals and targets will use the indicators to review their progress.

Concerns have been raised, however, about the contents of these reports. In Together 2030's review of the "main messages" components of the VNRs, they note a number of elements that are missing. For example, "too few countries present a clear cycle of accountability and how they are engaging stakeholders in the process" (Together 2030, 2017, p. 12) and some countries do not cover all 17 SDGs in their reports. Again, the issues of transparency, participation, and inclusivity come to the fore as elements needing the most improvement, even though they were specifically listed as important characteristics of the SDGs.

## 4.2 | Methods of Observation: Monitoring

### 4.2.1 | Types of Monitoring

Besides the reviewing process discussed above, monitoring aims to rectify the issues of transparency, participation, and inclusivity that are not part of the reviewing process. Monitoring is based on the continuous collection, analysis, and use of management information to support decision-making throughout the life of a project. In contrast to the review method, monitoring focuses on consistent, regular data collection that provides for a constant feedback loop—rather than single reports or review sessions every few years, which only begin collecting data once a date for review has been set. This practice of monitoring is not well defined by the General Assembly Resolution and is in fact barely mentioned at all. There is value in continuous data collection, but there is just no established method for doing this, nor any measurement on which to base it. Some indicators could certainly be applied in a continuous feedback context, but others would have to be adapted or changed entirely.

Considering methods of monitoring currently employed by intergovernmental organizations, monitoring can be broadly classified into two types:

- Micro-monitoring: continuous analysis and evaluation based on a set of determined criteria and established goals.
- Macro-monitoring: identification of emerging properties using an open consultation process that involves different stakeholders, and continuous analysis of the implementation of these properties.

## 4.2.2 | Potential and Challenges

In theory, monitoring would give a much more complete picture of the implementation of the SDGs in a given country, as countries would be expected to monitor every target, not only those they wish to highlight. Recognizing the vast potential of monitoring in realizing the SDGs, Husch, Saner, Yiu, and Zeitz (2014) proposed the following premises and rationale for having a separate monitoring system that could, for instance, encompass the following:

1. Monitoring the implementation of activities to support the SDGs not as an extension of fiduciary control but rather an essential management tool for organizing and managing the SDG implementation process, creating the means for ongoing institutional learning.
2. Giving authority and reliable information to multi-stakeholder groups to shape, reframe and reconcile the competing sets of SDG priorities and objectives. An effective monitoring system helps them to achieve this.
3. Monitoring as a form of constant and consistent data collection based on participation of state and non-state actors allows for the realistic assessment of progress and for reorganization of SDG implementation whenever necessary.
4. Targeting the most vulnerable populations and ensuring equity of access when making development-investment decisions, such as in education, health, public transport.
5. Avoiding the blame game of "who caused non-compliance with SDG implementation" by building in situ capacities that ensure local and national-level stakeholders can focus on truly designing and managing the processes of SDG implementation.
6. Achieving transparency in terms of policy decisions through monitoring in the context of development co-operation, to verify the compliance with the principles of the Paris Declaration and Accra Agenda for Action.
7. Forestalling the short-termism induced by a results-based management (RBM) approach and results-based development financing that leads to short-term and opportunistic undertaking at the expense of deeper-rooted and longer-term programming and undertaking.

Ideally, data collected in monitoring processes should be published by each country in an online database accessible to citizens and to other countries. One of the key steps in this process is creating information commons based on better monitoring practices. National statistical offices will be crucial to ensure the successful implementation of the SDGs. One example of an online database or publication is the United States' monitoring platform specifically for the SDGs: "U.S. National Statistics for the UN Sustainable Development Goals" (United States Data Federation, 2017). The US platform provides data and metadata for the indicators, as well as updates on the progress of gaining capacity to collect data on other indicators. The data is still only reported annually, however, and ideally (for those indicators without specific timeframes attached to them) it would be reported more frequently. Another example, the Mongolian National Statistics Office, has a webpage devoted to the SDGs. Though it does not show data on a year-by-year basis, it gives the most recent data for various targets and indicators in an easily readable format and also provides information about the availability of data for each indicator and designates the ministries responsible for collecting data and implementing policy (Mongolia National Statistics Office, 2017).

It is also necessary to stress the importance of disaggregated data for monitoring as well as in the review process. Countries are not monoliths and the accessibility of health services could vary widely from one region to another in a given country, while sex and age are also important factors and must be explored. Collecting national averages misses these nuances and can result in resources being

used in the wrong places on things that are not necessary, which could be better used in another way. Currently, disaggregated data is uncommon for all but the indicators that specifically mention the need for it—for example, some indicators request that data be disaggregated by age and sex. In an examination of 32 VNRs, Livia Bizikova of the International Institute for Sustainable Development noted that 69% of countries provided only national-level data with no disaggregation (Bizikova, 2017, p. 3). For any sort of evidence (whether review or monitoring) of SDG implementation and development to be meaningful, it must have this disaggregated component. In the future, countries should strive to include these statistics in their databases or in their reports.

There are, however, many challenges associated with monitoring. One such concern is of course the unavailability of methodologies for collecting data for many of the SDG indicators in review, let alone then translating these for use in continuous data collection. The most difficult and widespread issue, though, is the lack of capacity and resources to undertake such an intensive, continuous procedure. This is a problem not only for developing countries, but also challenging for richer countries. European Union (EU) member states such as Finland and Estonia reported in 2016 that only 40% and 14% of indicators could then be measured, respectively (United Nations, 2017a, 2017b, pp. 14, 22).

### 4.2.3 | The use of ICTs to achieve an innovative and responsive monitoring infrastructure

Findings summarized in *A Million Voices: the World that We Want. A Sustainable Future with Dignity for All* (United Nations Development Group, 2013) supports the proposal for a standalone Monitoring Framework that will give guidance to ongoing data collection and transparent reporting.

> *In many countries people are already involved in shaping new solutions—governments at all levels are engaging the public in finding solutions to natural resource preservation, innovative energy sources and monitoring public service quality. These efforts all form part of a complex dialogue that is generating the best ideas and building consensus on the post-2015 agenda: the World We Want (ibid., p. 7).*

> *DATA CONCERNS. It has been seen that the consultations call loudly and clearly for more accountable and responsive governance, and to leave no one behind. It is also recognized that, to ensure accountability and tackle inequalities, more data, better data, new types of data and more accessible data are needed. The need for a data revolution has been repeated several times. In the interests of ensuring a universal human-rights-based approach, there is a clear agreement that there should no longer be a focus on just national aggregates, but on disaggregated data—by income quintile, geographic region, sex, and by relevant social groups, particularly those most excluded. As discussed above, the focus on aggregate indicators diverts attention from the most disadvantaged and marginalized, who continue to be "left behind" (ibid., p. 40).*

As is often said, "all development is local". Monitoring and the corresponding data generation and collection need to reflect this operational demand and "user" concerns when services are provided and the SDGs are arbitraged and priorities are set. The monitoring effort and data transparency need to reflect the commitment of not leaving the marginalized, invisible and voiceless population behind.

An "outer space" (expert-driven macro-data) perspective of global monitoring offers little to the local administrations and concerned actors except shame and blame.

The growing conversation and increased calls by people to "work together" and for "greater participation" need to be heeded. How can this collaboration at multiple scales be achieved? How can we create the means to fully incorporate the voices of the billions of human beings who populate this planet? How can we truly act on the idea that "global problems can best be solved by thousands, even millions, of people working together"? How can national institutions and frontline service-delivery agents absorb this multitude of ideas and make best use of them?

Given operational questions such as these, and the inherent complexity of the SDGs, analysts, policy-makers and activists have to be realistic and use the existing practical tools to gather the real-time data required to implement projects, monitor progress, assess impact, identify false assumptions and mitigate gaps.

With the evolution of ICTs, "new" SDG monitoring processes can combine computer science, information systems, development studies and system thinking. A new SDG monitoring process would move from assessing if "needs"—often defined by people outside the affected communities—have been "met" to a process in which a community's real internal "wants" takes precedence. A new SDG monitoring process would not only capture the state of the affairs at different times and spaces, but also record how things have been done, where they have been done and why they have been done. Such an institutional memory will lend a managerial view to the situation if it were found wanting.

Mobile technology and the proliferation of smartphones, even in the poorest regions, allow citizens to feed in information about the current situational data regarding everything from health, education, roads, water or disease to medical supplies, etc. Data essential for basic survival and people's well-being is now available at any time. However, there can also be pitfalls to the use of ICT and digitalization. For instance, blockchains can provide useful support for some monitoring processes, but criticism of their use, for instance in the financial sector, should be considered (Roubini, 2018). A useful list of basic principles for digital development elaborated by Heimerl and Razza (2018) is also applicable for SDG monitoring based on the use of ICTs.

If there is a common template and standard for working with this kind of data, then citizen reporting can also be harnessed for collective action and form pivotal feedback signals to the institutions expected to achieve development results. Internal "memory" could also provide an avenue for investigation for troubleshooting if and when there is negative feedback from any specific group or place.

While citizens are empowered to engage in multi-stakeholder dialogue, paradoxically, it will be institutions' capacity or lack of capacity to validate, to "in- source" (as opposed to outsource), to analyse and to act that might prove to be a bottleneck.

The MDG results speak volumes about this disparity and under-addressed failure of weak or non-existent institutions in many parts of the world. While the global community is formally committed to leave no group behind, overlooking the institutional bottleneck revealed by the global monitoring of development results will just continue to exasperate the phenomenon of the "development orphan state". A nationally centred monitoring framework would complement and strengthen global monitoring and result in positive reporting effects that ensure that no country would be left behind.

Using contemporary ICT techniques and tools for monitoring and accountability is about reframing development. Where early ICT had a supply-driven focus that frequently marginalized impoverished communities, contemporary models seek to place communities at the centre and create a demand-driven focus. Where early ICT re-enforced a top-down model—characterized by a view of largely passive "consumers"— it can now support the marginalized as active producers and innovators to escape from the trap of poverty and deprivation.

# 5 | THE ROLES OF DIFFERENT STAKEHOLDERS IN TRACKING PROGRESS

## 5.1 | Role of Civil Society

Many governments are reluctant to provide public databases or reports as they feel that transparency is against their interests. This is the case for many countries with undemocratic institutions and goes against SDG target 16.6: "Develop effective, accountable and transparent institutions at all levels" (United Nations, 2017b). If countries commit to the SDGs, they should be committing to all their elements. The VNR is again not the best possible tool for keeping countries accountable, due to its voluntary nature and its review format, making it easy for them to exclude certain goals and targets that they feel do not represent their interests or are less important. The interconnected nature of the SDGs means that however reluctant states are, monitoring of all SDGs is necessary to provide true transparency and accountability.

Since civil society has networks at the national level, it could enable the spread of relevant information by using its connections and networks (Saner & Yiu, 2015; Saner & Sapienza, 2012). Civil society could provide the continuity in monitoring and data collection and address issues that are not usually taken into account by governments and their respective statistical offices. Ricardo Fuentes-Nieva from Oxfam GB suggests the following roles of civil society in regard to monitoring of the SDGs:

- Civil society has the responsibility and the opportunity to look for different interpretations of official data. It should not take for granted the official interpretations. Instead, it should look for alternative stories.
- Political economy of data: data collection and data dissemination. Civil society has to protect the independence of national statistical offices from political manoeuvring. Besides, it should make sure that there is enough money to collect data in order to effectively monitor the SDGs, and that these data are not used for short-term political interests. Statistical national offices should be able to work without the interference of political and economic interests. Data create power, wherever the control of data is, there is also the power of narrative. Civil society has to make sure that statistics offices and their resources are independent.
- Civil society should invest enough time, attention and resources to illuminate problems and issues that are not part of the agenda yet. It should look for problems which are not yet part of the usual portfolio and statistics. Oxfam has been successful in doing this in the area of inequality (Fuentes-Nieva, 2016).

Creating the means for civil society to participate in the SDG monitoring process through the use of ICT can offer benefits but should be carefully assessed in relation to its inadvertent negative effects for social participation. Social participation is more time-consuming and needs special professional support to avoid power struggles and possible conflicts which could jeopardize the inclusiveness and transparency of social involvement in monitoring. There can also be important negative implications of using ICT in social participation efforts. Roberts and Marchais (2018, p. 1), for instance, state:

> *After an initial period of uncritical optimism regarding the potential of social media and digital technologies there is now however a growing recognition that they come with new practical, ethical and methodological limitations. Indeed social media content is often the target of conscious distortions, manipulations, or censorship by a range of*

*actors. Bias of several kinds can significantly distort social media data and reduce its representativeness.*

One promising ICT method allowing for social participation is the GroundTruth method. The first author organized a panel during the 2018 World Summit on Information Society (WSIS) conference to get feedback from practitioners about the advantages and disadvantages of this method. Panellists agreed, and the audience supported the observation, that SDG monitoring could benefit from ICT-supported application of GroundTruthing and other participatory methods and stated that social participation would make the SDG monitoring process more participatory, inclusive, and transparent. It would highlight gaps in SDG implementation through the identification of needs among populations. However, panellists also warned that participatory methods need to bear in mind the potential bias and data-protection concerns, which could be mitigated by triangulating the data provided through GroundTruthing methods.

A similar concern emerges from research undertaken by Roberts (2017) and Roberts and Marchais (2018), who examined the relationship between technological artefacts, participatory processes and development outcomes and asked to what extent one contributes to another (Roberts, 2017). Roberts concludes that

> *Affordances seem to provide a potential conceptual means to bridge the relatively technocentric and realist approaches of some IS, HCI and ICT4D with the relatively anthrocentric and constructivist approaches of some STS and development studies. (Roberts, 2017, p. 1)*

Roberts' caution regarding the use of ICT is pertinent also for monitoring the SDGs. At the same time, careful use of ICT by civil society can provide much-needed information in areas that are known to be insufficiently monitored by many governments, namely human trafficking (Saner, Yiu, & Rush, 2018).

Most governments currently lack the capacity to collect data on all of the SDG indicators. In a world in which they may have to prioritize which targets and indicators they monitor, how do they go about choosing what to focus on? For instance, why should the issue of human trafficking be one of the priorities? This question is particularly poignant in view of the competing claims on limited domestic resources and when human trafficking is not a major focus throughout the SDGs.

## 5.2 | Role of international organizations

There are currently many different initiatives on the part of international organizations to monitor various aspects of the development agenda. For example, the United Nations Children's Fund (UNICEF) collects data worldwide on issues relating to children's development and wellbeing, such as primary education enrolment or infant mortality, and publishes it online in its annual *The State of the World's Children* report. All of the data behind the report's findings are easily accessible online and can be compared to data from previous years. The United Nations High Commissioner for Refugees' (UNHCR) statistics portal and its annual *Statistical Yearbooks* provide data on refugees, internally displaced persons, stateless people, and other at-risk individuals that is easily accessible and can also be compared to past data. These and similar initiatives are fantastic resources, but in this highly interconnected world and the grand nexus of interrelated

issues (particularly in the case of the SDGs), innovative practices must be found to meet the needs of modern monitoring.

One such example is the work being done for SDG 4, Education. Each year, the United Nations Educational, Scientific and Cultural Organization (UNESCO) publishes an extensive *Global Education Monitoring Report* which details the challenges involved with implementing SDG 4 as well as examples of practices from different countries and data to compare and show progress. One such practice that is discussed in the 2017/18 report is Peru's education monitoring system. In 2016, 338 trained monitors conducted unannounced visits to schools across Peru, using internet-enabled tablets to collect information on various indicators related to SDG 4, such as student/teacher attendance and the availability of learning materials. Local and regional reports were posted online and updated every month and were sent to regional and local education offices for support purposes (UNESCO, 2017, p. 146). Training and empowering monitors to conduct site visits such as these, when appropriate, could be an important way forward.

The Transparency Framework established for the Paris Climate Accord is a method that blends monitoring and review. Every two years countries are subject to a technical expert review (TER), designed to track progress in implementing measures to move towards the National Determined Contributions of each country. To enhance transparency, countries are also obliged to report, within their capacities, data tracking the implementation process of their goals outlined in the Accord (Elliott, Levin, Thwaites, Mogelgaard, & Dagnet, 2017, pp. 6–7). This dual method of review and monitoring could be a way to compensate for countries with fewer capacities to collect data and maintain greater transparency for all during these processes. The review aspect also serves to validate the data that has been collected during monitoring over the previous two years.

Table 3 summarizes the two examples representing more innovative and collaborative governance approach needed to reach the SDGs by 2030.

# 6 | WAYS FORWARD

To implement the SDGs, there is a need for comprehensive and differentiated data collection that reflects the operational realities at different levels of each country. Such detailed data can support a country's managerial decision-making and monitoring of operational progress towards the SDGs at all levels, i.e. national, regional, and subnational. With the use of a coding standard, data sets can more easily be integrated and compared and links between such issues as climate change adaptation needs,

**TABLE 3** Summary of innovative and collaborative governance approach to review and monitoring

| Who | What | How |
| --- | --- | --- |
| Peru | SDG 4, Education | Fresh ground-up data through citizen engagement and modern ICT: Unannounced school visits by trained monitors with an online database based on the indicators which is updated monthly. |
| States Party to the Paris agreement | Paris Climate Accords | Hybridization of review and monitoring: Obligatory reporting of data within each country's capacity and biennial Technical Expert Review (TER) under the Transparency Framework. |

*Source:* the authors.

water contamination, communicable diseases, transport, drought and poor agricultural production, and food security can now be seen in real time. Gaps and overlaps in resource flows can be fully monitored.

New analytic tools can disaggregate enormous amounts of diverse data to offer both "broad" and "granular" views of the social landscape and offer a more realistic context concerning a country's SDG challenges. Situational and institutional complexities can be captured, offering fully relevant and grounded information to policy-makers and decision-makers. From smartphones to the cloud, innovation in ICT allows for data collection and dissemination to be dynamic, immediate and participatory. Twenty-first-century development efforts through the integration of appropriate ICT to aggregate, curate, and visualize data could be the foundation of a dynamic and relevant SDG implementation.

A dynamic SDG monitoring system could be a basic policy management tool to support accountability and transparency across complex governance structures. An integrated SDG monitoring process would support continued reporting of data at all levels, provide a means to assess and adjust the quality and impact of policy choices, and create "on time" operational scenarios and strategies to help countries trace and track current implementation of their SDGs.

Finally, a relevant and logical monitoring system, integrated across all stakeholders, would be a process that empowers all stakeholders (state and non-state) to participate and to contribute to the realization of their country's SDGs. New voices can be heard, new insights attained, and greater participation supported. This means that monitoring can support good governance through consensus-building and transparent information-sharing.

Below is a proposal for a set of actions that build into a coherent response to the need for an inclusive monitoring approach and architecture.

## 6.1 | Action 1: Path-finding and demonstration countries to launch the global SDG data hubs

At this juncture, there is a readiness to move to the next level of action. Stakeholders in early-action countries are considering ways to move ahead to build a multi-stakeholder coalition to support the implementation of the SDG framework, including multi-stakeholder monitoring, evaluation, and accountability mechanisms. National and international partners need to collaborate to establish a data-driven SDG platform in early-action countries. SDG data hubs would be expected to enhance aggregation, curation and visualization of critical data. The SDG data platform could be designed to ensure:

- authentic and robust multi-stakeholder engagement;
- that stakeholders make "commitments to action" on a periodic basis;
- unified data-driven monitoring and accountability hub;
- that broad-based youth and citizen engagement is enabled; and finally,
- accountability positively incentivizes bolder and faster action and impact.

## 6.2 | Action 2: Deploying appropriate and state-of-the-art technologies, techniques and tools

Clearly it is time for increased leveraging of mobile and internet-based applications, participatory maps and crowd-sourced event data, aerial and satellite imagery, geospatial platforms, advanced

visualization, live simulation, and computational and statistical models to power effective monitoring of SDG-related activities. New technologies now offer more relevant and rapid responses to an increasingly complex development agenda.

Increased use of appropriate information technologies will create an understanding that to achieve the SDGs, nations cannot rely on a single organization or institution to bring together the diverse SDG actors with very different goals, aims, strengths, interests, and backgrounds. Such an attempt would be slow and costly. Rather, by accessing and using these new "linking technologies", networks of interested parties, collaborative efforts of stakeholders, and alliances of communities, a new basis for conversation, information sharing, and action will be created.

The rise of handheld GPS units, Google Maps, and OpenStreetMap, for example, assisted in the early development of crisis maps, as crowd-sourced data and new users began to make conflict maps for themselves for themselves (CrisisMappers, n.d.). Over the past few years, people learned they can share their stories about what is happening to them in real time through SMS, Twitter, and other social media. Other examples and niche tools abound.

## 6.3 | Action 3: Linking existing data sets

Over time, and with appropriate governance, open-sourced data that is generated from multiple sources and at multiple levels of operation can be fully linked: from the local/city level, to country, regional, and ultimately the global level. Data platforms and standards are needed that ensure interoperability of both quantitative and qualitative data from multiple sources and institutions across the SDG agenda. A unified hub of static and dynamic data can be created, layering major categories of data such as:

- global reporting systems and surveys;
- country reporting systems and surveys;
- open data from governments, the private sector, and institutions on "commitments to action";
- dynamic social data;
- citizen-generated data;
- environmental and geospatial data;
- global indices, such as the Human Development Index, the Open Budget Index, etc.; and
- private corporate data sets connected to corporate social responsibility (CSR) and the Global Compact programme.

## 6.4 | Action 4: Shared communication and data collection template: A monitoring standard

Based on the best practices from different sectors, a standard reference template needs to be developed. For monitoring and cross-sector data integration and analysis, as well as "cross-practice" collaboration, there needs to be a conversation and deliberation focused on the creation, dissemination and use of standard data-coding processes. To begin to share and integrate data, it is essential to agree on a "vocabulary". Data sets derived from across the global spectrum of key actors, including national ministries, NGOs and commercial entities, need to be comparable. The reason for a standard is that

# The Three-Tiered Monitoring Framework at the global level
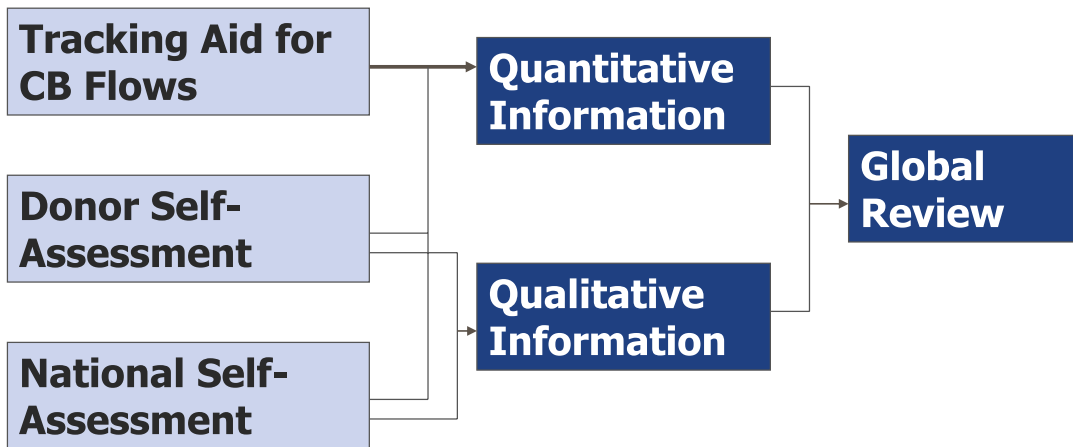


© Yiu (2008)

**FIGURE 1**    The global architecture for monitoring
*Source:* Yiu (2008)

different local, national, regional and global actors mandated to collaborate on SDG-related issues have no common tool or standard to share data. There is no commonly agreed-upon mechanism to bring all the diverse data sets together.

We need a dynamic and adaptable standard coding process. This first step to data integration, including the ability to integrate qualitative and quantitative data, will offer a new way to make sense of data from diverse sectors, sources and time periods.

The UN's *MDG Monitor Report* (United Nations, 2009) began a "standard" design process which was augmented by pilot national programmes. Now a standard monitoring language, for example, has been used to integrate diverse data sets to monitor climate change adaptation projects and link with development goals in eight African nations. This ongoing work can be further supported and disseminated.

The proposed monitoring standard could encompass the following elements (for a detailed discussion, see Yiu & Saner, 2011):

- Data definition based on stakeholder participation to ensure inclusive policy priorities and criteria.
- Data-collection and dissemination procedures for tracking the entire SDG implementation process.
- Reporting format for collecting, sorting, storing and retrieving data for statistical analysis.
- Participatory approach to micro-foundational monitoring in order to capture the subnational diversity and disparities in terms of multidimensional poverty and varied pathways in attaining sustainable development.
- Visualization at subnational level for whole system mapping and "at-a-glance" reporting for easy comprehension and priority setting.
- Periods for management review against agreed evaluation criteria.

# CSEND's Non Fiduciary AfT Monitoring Framework (within borders)
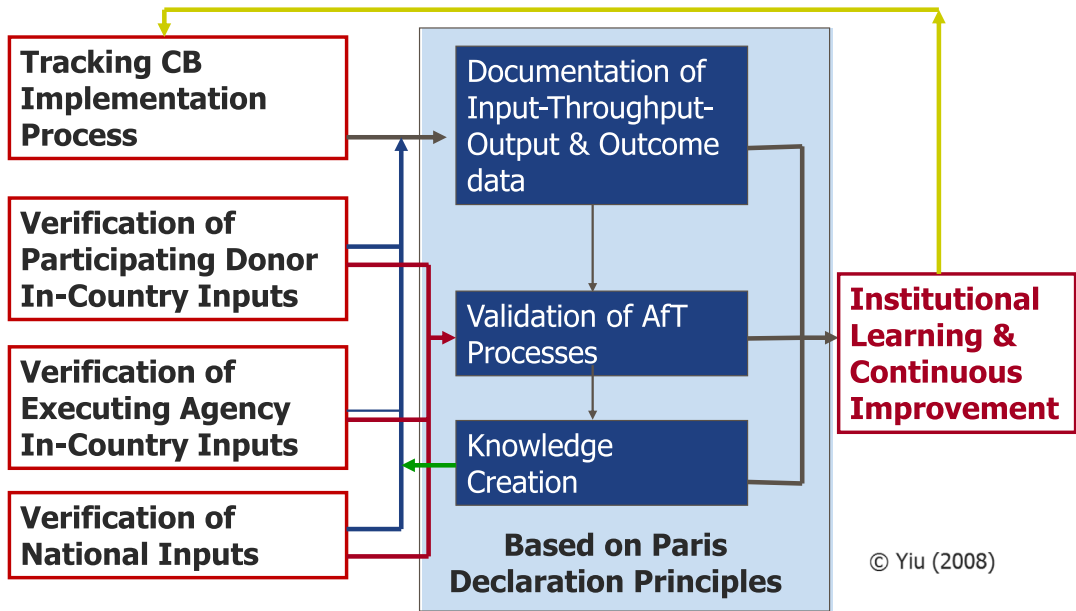


**FIGURE 2** The national architecture for monitoring
*Source:* Yiu (2008)

These elements should be streamlined into a monitoring architecture in order to capture the practice and progress of SDG implementation at the global and national levels. A preliminary sketch of such a monitoring architecture at the global and national level are illustrated in Figure 1 and Figure 2 below.

## 7 | CONCLUSION

The SDGs aim to enable people to understand the world in fundamentally new ways. They call for people to work together to bridge the complex differences that define human lives. Thus, the call for strong review and monitoring is about the sustainability, scalability and impact of development work. An up-to-date information collection, analysis and dissemination infrastructure needs to be part of the SDG review and monitoring approach in every country.

Review on its own is a useful practice because it often allows for deeper engagement, but to be truly effective, it must be complemented by a monitoring process that integrates both practices of micro- and macro-monitoring. This combination ensures a process based on transparency, inclusiveness, and the participation of civil society. A rigorous multi-stakeholder review and monitoring process is possible with the help of advances in information technology and analytical tools. These developments help countries better track SDG progress by equipping them with the necessary tools to dig deeper and reach the GroundTruth.

Needless to say, tracking progress towards attaining the SDGs is an important but challenging task. Though the SDGs are interrelated, it is not unreasonable to suggest that each goal or target might

need its own specific form of review and/or monitoring, beyond what is outlined in Resolution 70/1. This is likely to mean more work for the international community, but the SDGs were not meant to be easy—otherwise they would have been accomplished already.

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