Making data work for human development

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ABSTRACT

This policy oriented paper underscores the importance of improving data for advancing human development and identifies ways to strengthen links between better data and better development outcomes. It explores two questions. What types of policies and institutions are needed to enhance data collection and compilation efforts so that human development conditions and progress can be tracked and evaluated with renewed breadth of dimensions and depth of disaggregation? And what actions and institutions can translate these new tools of assessment into the greatest positive improvements in people's lives, so that no one is left behind? The paper identifies a framework with five clusters of actions that can help build measurement capacity and bolster evidence-based policymaking for advancing human development. Actions concentrate on strengthening data availability, using data to make inequalities visible, expanding access to information, upholding human rights in the data age, and increasing the use of evidence in decisionmaking.

Introduction

Enabling all people to realize their full potential in life requires action, and action requires information. A basic condition for advancing human development and achieving the Sustainable Development Goals (SDGs) is the use of data and measurements to establish the most comprehensive possible mapping of human conditions today in relation to the goals we have set for the future. Such mapping must build on core indicators like the Human Development Index (HDI) but extend the capacity for analysis and action by moving beyond averages, prioritizing quality over quantity to measure achievements, and identifying and filling data gaps where threats to vulnerable groups are not being monitored enough. This mapping can also be complemented with perception measures to create the fullest account of people's lived experiences and priorities. These statistics and indices can be an evidence base to direct policy action towards a better future for all.

Such comprehensive mapping cannot be done without timely, disaggregated and comparable data. And for this, the need for expanded capacity and financial support is great. A new international climate of data cooperation is building from the agreement of the 2030 Agenda for Sustainable Development and the adoption of the SDGs, so the quality and timeliness of statistics may improve in all global regions. Big-data technologies that can capture patterns and trends of human behaviour in real time also present considerable opportunities for data gathering.

But improved statistics will not automatically enable progress towards reaching those who have been left behind. Statistics are produced and consumed by people and institutions who function in particular social and political milieus. Ultimately the same social norms, and political and economic inequalities that have formed barriers against all people achieving their full life potential over the past 25 years could influence how data are collected and used (or misused) over the next 25. Generating comprehensive data maps is a first, and very important, step towards advancing human development, but moving from better measures to better outcomes takes much additional work.

This paper explores, from a policy perspective, two questions at the centre of strengthening human development measures for improving human development outcomes for all people. What types of policies and institutions are needed to enhance data collection and compilation efforts so that human development conditions and progress can be tracked and evaluated with renewed breadth of dimensions and depth of disaggregation? And what actions and institutions can translate these new tools of assessment into the greatest positive improvements in people's lives, so that no one is left behind?

The paper identifies a framework with five clusters of actions that can help build measurement capacity and strengthen evidence-based policymaking for advancing human development (see the infographic). The framework focuses on how to ensure that data are available for identifying those who have been left behind and the vulnerabilities they face; and how to ensure that human development measures are used to help all people achieve their full life potential. The clusters concentrate on strengthening data availability, using data to make inequalities visible, expanding access to information, upholding human rights in the data age, and increasing the use of evidence in decisionmaking.

Infographic: A framework for action

Strengthen **data collection** efforts
- Finance statistical activities
- Build capacity
- Regulate statistical systems
- Carry out frequent surveys

Collect data to **unmask inequalities**
- Dissagregate data
- Identify and fill data gaps
- Consider subjective measures

Making data work for universal human development - **a framework for action**

Expand access to data and information
- Support open data initiatives
- Promote public-private partnerships
- Build data literacy

Uphold human rights in the data age
- Prevent data based discrimination
- Protect privacy
- Empower marginalized groups

Use evidence to inform decisions
- Shape policy agendas
- Shift cultural norms
- Refine data communications

Strengthen data collection efforts to map human development

The consistent collection of data faces long-standing challenges in monitoring human development at a basic level, let alone in collecting more disaggregated data and data on quality, perceptions and vulnerable groups. Statistical agencies are being called on to provide timely data that speak to multiple development priorities and respond to the varying concerns of national governments and international institutions. This is not to mention taking into consideration the data

needs of civil society groups and respecting the time of household members who participate in surveys.

As demands for better data grow, many national statistical offices continue to struggle with inadequate financial resources, incomplete technical capacity and infrastructure, and loosely coordinated and regulated statistical systems. Data collection efforts are often underfunded; technologies for the collection, storage and dissemination of data are frequently outdated; and expertise in survey techniques and data analysis can be thin on the ground. The capacity to report on human development progress and gather SDG indicators is stretched in developed and developing countries alike. Indeed, the World Bank's Statistical Capacity Indicator, which assesses data collection standards, methods and periodicity, as well as data availability and reliability, shows a gloomy picture of statistical capacity in most countries, especially in Africa and the Arab States.[1]

In the interest of directing policy to meeting the SDGs and to filling human development gaps, urgent action and resources are needed to build strong statistical systems and robust data collection and sharing efforts.

Increase funding for data collection and statistical initiatives

Frequent and high-quality surveys require financial resources, yet many programmes remain underfunded as countries face financial trade-offs with other priorities. The Partnership in Statistics for Development in the 21st Century (PARIS21), the Marrakech Action Plan for Statistics (MAPS) and SDG 17.19[2] all map out statistical capacity needs and call for renewed international support. Yet international financial support for the collection of high-quality statistics in 2006–2014 fell below the annual amount needed to support the production of Tier I and Tier II indicators for the SDGs (figure 1). [3] Upgrading the statistical systems of the 77 lower-income countries to meet the requirements for monitoring the SDGs is estimated to cost $1 billion a year.[4]

Increases in financial resources for statistical programmes are needed to improve data availability, especially for the types of data most central to human development monitoring for groups that have historically been left behind. Assessments of aid flows to statistical programmes in 2006 and 2014 indicate that there have been increases in resources for activities related to environmental, demographic and social statistics (figure 2).[5] This trend indicates that agendas like the Millennium Development Goals (MDGs) and SDGs may generate demand for better statistics on issues central to human well-being. Efforts to extend data collection on issues of sustainability and social well-being should continue to receive support; and more broadly, financing for stronger statistical systems should be prioritized. Generating better statistics must be treated as a global priority and a foundation for policymaking and for addressing the needs of marginalized groups.

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[1] World Bank 2016.

[2] "By 2030, build on existing initiatives to develop measurements of progress on sustainable development that complement gross domestic product, and support statistical capacity-building in developing countries."

[3] Open Data Watch 2016. *The State of Development Data Funding 2016*.

[4] Sustainable Development Solutions Network 2015.

[5] PARIS21 2016.

Figure 1: Global financial support for statistical activities—not keeping pace with demand
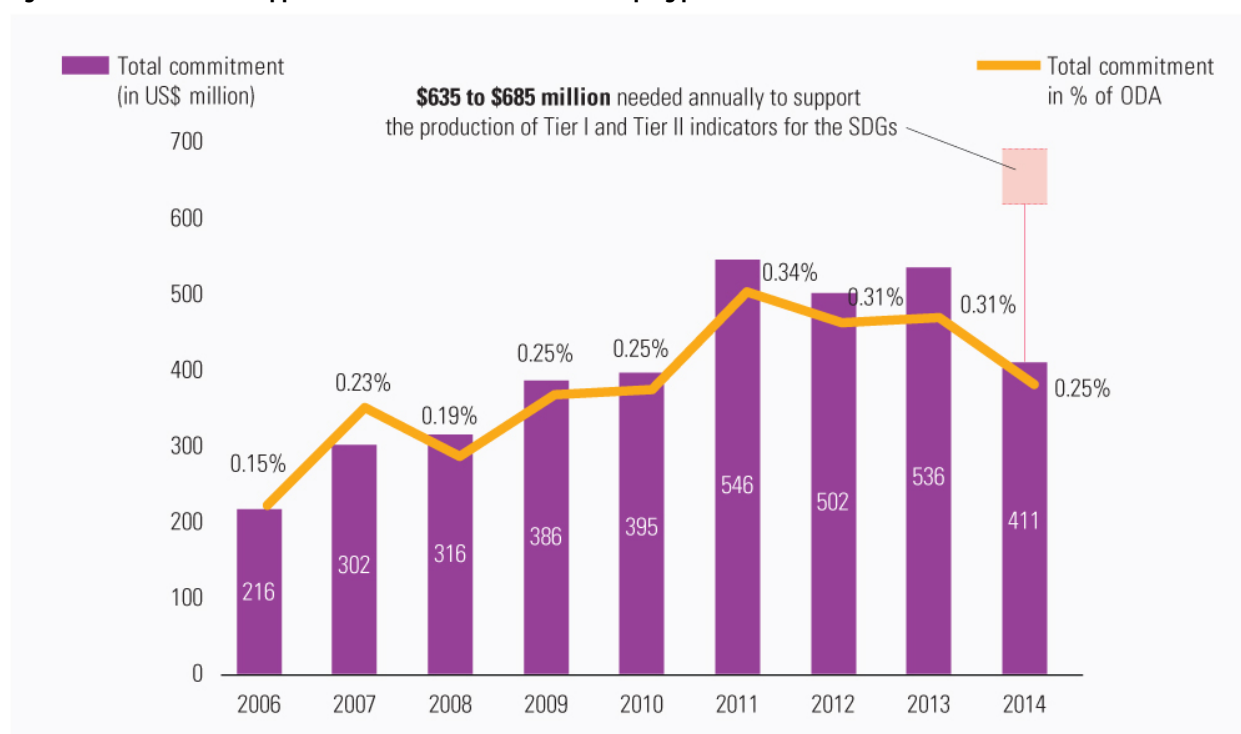
Source: Calculations based on data from PARIS21 2016.

For financing data collection, national statistical systems are grappling with how to respond to increasing demands for data on the SDGs and from various stakeholders, while fulfilling national data collection obligations and priorities. Given that statistical systems in many countries are underfunded and short on data collection capacities, trade-offs in data collection are inevitable, so data collection that responds to the most pressing needs of national policymakers is most likely to be prioritized. In many cases there may be overlaps between data required for human development monitoring and for national policymaking, and indeed, this would be the hope from a human development perspective. Ultimately, national ownership of statistical strategies needs to be a focus of international and regional assistance for capacity building and data collection. Support for national and regional human development reports is one opportunity for facilitating dialogue and identifying common goals between national policymakers and global agendas promoting human development.

Figure 2: Trends in aid distribution by statistical activity, million USD
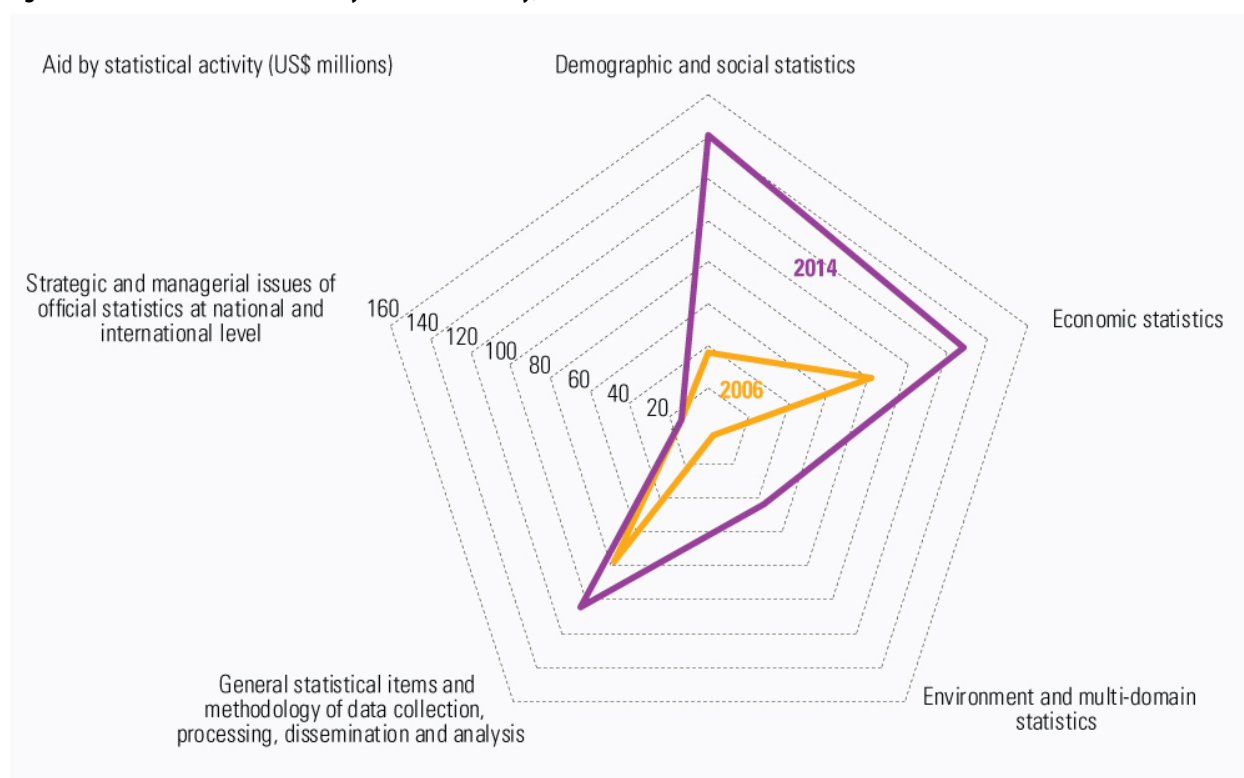
Source: Calculations based on data from PARIS21 2016.

Build strong human and technological capacity

High-quality statistics depend on statistical expertise and strong capacities in human resources and technology. But many countries face staff shortages, limited expertise in advanced-survey design and analysis and in the use of big data, and outdated technologies.

Such constraints were reported by many countries in their voluntary national reviews on the implementation of the 2030 Agenda. France and Montenegro estimate that they can produce data for over half the indicators in the short to medium term. Finland can report on 40 percent of the indicators, Uganda 35 percent and Estonia 14 percent.[6] Some countries have recognized the importance of improving their registry system and record management, others have stressed the challenges of producing data at the local level or for subgroups of the population, and others have highlighted their need for technical or financial support.[7] Georgia, Madagascar, the Philippines and Samoa have called for capacity-building assistance to improve the quality of data.[8]

Efforts to build skills with short training courses and workshops can introduce new ideas and help trained professionals to strengthen existing skills, but longer-term investments in human

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[6] UNDESA 2016.

[7] UNDESA 2016.

[8] UNSDSN 2015.

resources are needed to build statistical human resource foundations. Statistical schools and campaigns to attract students, combined with long-term on-the-job training programmes for trained statisticians, have been very successful.[9]

Providing technologies and tools to assist in data collection and analysis are also important. But the tools must be appropriate for existing statistical expertise, communications infrastructure and even climate and legal infrastructure. Where the Internet is not widely available or where electronic records are uncommon, alternatives to digital data collection need to be considered.[10] Other countries may not have established legislative systems outlining the legal authority of different bodies to produce data or coordinate statistical activities.[11] Technology transfer and statistical capacity building are best carried out in coordination with national counterparts, so that local conditions and systems are taken into account.

Institutionalize standards for data collection and dissemination

High-quality, trusted statistics require coordinated efforts, common standards and transparent methodologies and survey processes across different levels of government, from local to national. Guidelines, such as the Fundamental Principles of Official Statistics, exist but many countries lack the laws to uphold them. Coordination and data sharing among ministries may be limited, and access to data not equal or open. Severely hindering the quality and availability of data, these conditions can erode public trust in statistics.

Establishing and supporting statistical institutions and principles are critical parts of statistical capacity building. At the most basic level, national laws should codify the obligations and duties of the statistical system and agencies, ensure the integrity of data, and define the statutory rights of data-producing agencies.[12] Laws and institutional arrangements will vary by country, reflecting forms of government and administrative systems, but the following elements are important:

- Specification of the primary agencies and institutions within the statistical system, including their mandates, legal powers and obligations. In many countries, this would centre on a national statistical office that coordinates data collection from ministries and agencies like central banks and ministries of health. Data collection obligations and mechanisms for coordination and data sharing need to be defined.
- Legislation that safeguards the confidentiality of the information collected and that protects the privacy of suppliers. This includes the rights and obligations of survey respondents.
- Provisions to uphold the political independence and impartiality of statistical agencies through clear lists of agency functions and clear processes for appointing high-level managers.
- Requirements to communicate and publish statistics and to treat data as a public good.

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[9] OECD 2009.

[10] OECD 2009.

[11] IMF 2005.

[12] IMF 2002.

- Frameworks for advisory bodies to ensure meeting the statistical needs of major data users.
- Requirements for regular reporting on data collection and resource use to promote transparency.

Carry out frequent and regular national surveys

Data collected at frequent intervals can capture changes in human development in response to interventions and allow for more efficient policymaking. But there can be long time-lags between surveys (figure 3). The last time an internationally standardized household survey took place in Brazil, China, Papua New Guinea and Paraguay was over 20 years ago. Of course, many countries conduct national surveys even when internationally standardized surveys do not take place. In Brazil, for example, the National Household Sample Survey (PNAD) is conducted annually, as are the China Family Panel Studies. But regular, standardized and comparable international surveys are essential for development monitoring and evaluation. The reasons for infrequent surveys can include strained financial resources, presence of conflict, and geographical barriers, as with Small Island Developing States.

Figure 3: Average frequency of internationally standardized household surveys
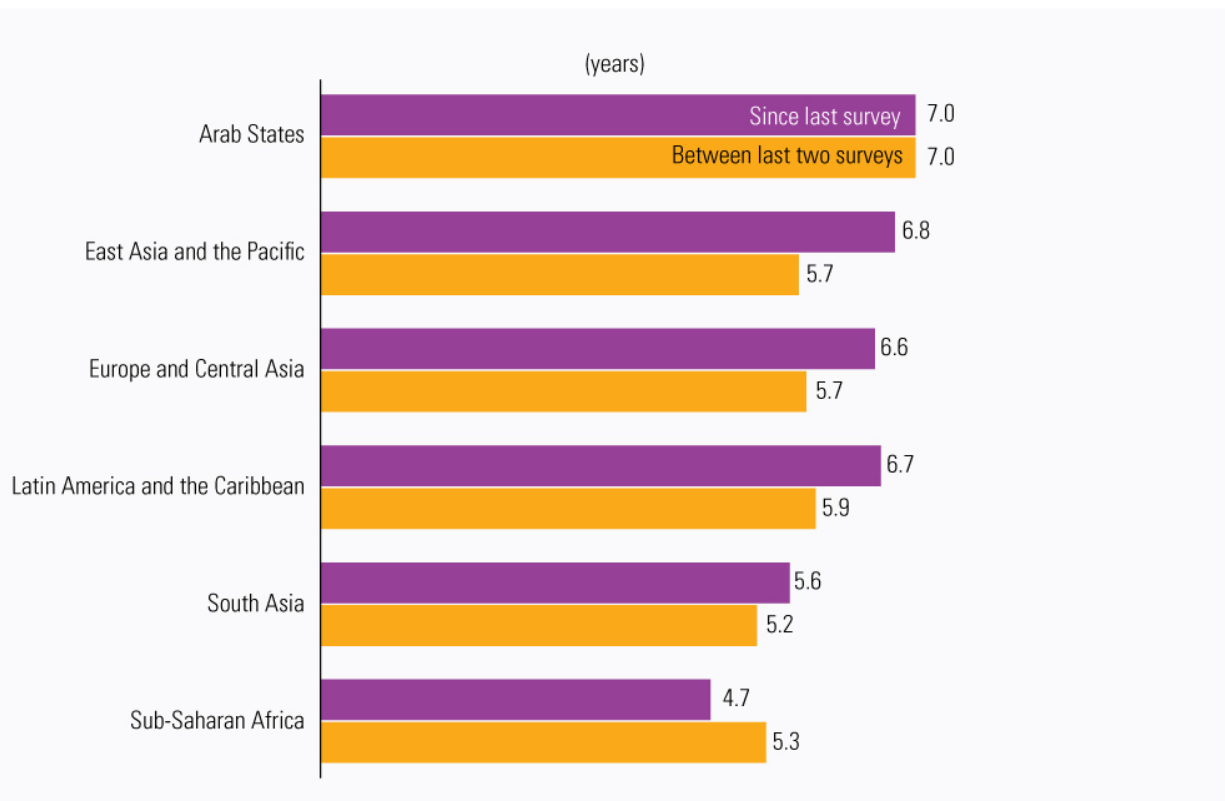
Source: Calculations based on MICS (UNICEF), DHS (ICF Macro) and LSMS (World Bank).

Some countries are making real efforts to increase the frequency of such surveys, and others could consider similar approaches. Peru and Senegal are experimenting with a continual Demographic and Health Survey (DHS): indicators likely to change rapidly are collected annually, while indicators that change more slowly are collected less frequently.[13] Continual surveys reduce the financial and human resources required for frequent surveys and enable better tracking of key indicators. The DHS programme has also experimented with shortened surveys that can be carried out frequently with small sample sizes, including Key Indicator Surveys and an Interim DHS.[14]

Use data and measures to unmask and tackle inequalities

A key action for making data work for human development so as to leave no one behind is to ensure that data are used to reveal imbalances—across urban and rural areas, between men and women, among different ethnic groups, at various points during an individual's lifecycle, and for sexual minorities, indigenous peoples, people with disabilities and other vulnerable groups. This should be accomplished through the use of disaggregated data for policymaking; analysing data that capture inequalities and barriers facing marginalized groups; and exploring perception data to understand how people view their life conditions.

Analyse data in disaggregated form to reveal inequalities and reach those left behind

Moving beyond average measures of human development to capture the deprivations suffered by vulnerable groups is at the heart of attaining human development for everyone. With the objective of leaving no one behind, calls for more disaggregated data are built into the SDGs with specific groups mentioned in many of the targets. To serve the agenda of universalism, data informing human development measures must be disaggregated to capture potential vulnerabilities across groups. These data can then be used as evidence to inform policy design aimed to meet the needs of marginalized groups. Limitations in the capacity to collect disaggregated data and at times the political sensitivities surrounding these initiatives have slowed actions. But many international household surveys like the Demographic and Health Surveys Programme, Living Standards Measurement Study and Multiple Indicator Cluster Surveys already include data on some aspects of well-being including health and education that can be disaggregated by sex, age, location and income decile.[15]

As a starting point, countries should review data sources to identify opportunities for taking greater advantage of existing disaggregated data, and to identify shortcomings that can be addressed by expanding surveys or tapping additional sources. For example in the Republic of Korea, data disaggregated by age, sex, educational attainment and income are quite common and can be analysed to pinpoint some specifications about deprivations; but disaggregation by disability and migratory
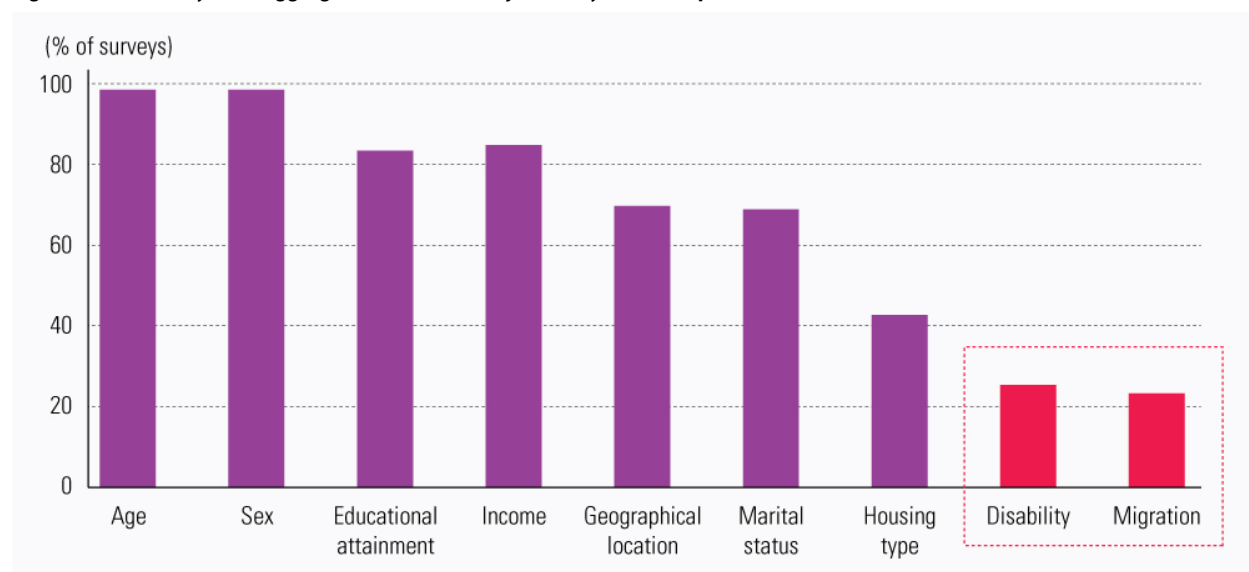
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[13] DHS 2014.

[14] Alkire 2014.

[15] Espey and de la Mothe Karoubi 2015.

status is included only in about 20 percent of the 30 major national surveys, so the deprivations of migrants and disabled people are unlikely to be captured (figure 4).[16]

Figure 4: Availability of disaggregated data in 30 major surveys in the Republic of Korea

Source: Kim et al. 2016.

In countries without strong statistical and data collection capacities, there may be large gaps even for commonly disaggregated attributes including age and educational attainment as well as for characteristics like ethnicity or migratory status. Based on reviews of survey coverage, some countries are taking steps to add undermeasured attributes to surveys, such as Egypt, where disability status was included for the first time in the 2016 national census.[17] All countries are encouraged to take up such reviews of the extent to which data are collected in disaggregated form for vulnerable groups and to add new categories and questions to surveys to capture important characteristics.

The most marginalized groups may be invisible to standard survey techniques altogether, including those who are refugees, migrants, homeless, incarcerated, in hospital or lack any kind of formal identification or even birth certificate. Survey coverage should be extended to include the characteristics of these groups. Another step is to ensure that everyone is counted through the provision of legal identity to all. Peru has made civil identification a national priority and built an inclusive and comprehensive national ID programme coordinated by an autonomous civil registration and identification agency.[18] There are also possibilities of using digital data produced by mobile technologies and expanding administrative registries to produce disaggregated data and create statistical information about those who are uncounted.

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[16] Kim and others 2016.

[17] UNDESA 2016.

[18] Reuben and Carbonari 2017.

Investments are needed to build national statistical capacity in techniques of collecting data on the most vulnerable groups, including:

- Training in methods for covering "invisible" groups in censuses and surveys.
- Methods for drawing on data generated by new technologies to capture transient populations.
- Survey practices for capturing sensitive information such as disabilities. Survey participants should also be able to self-identify as a member of a group, and marginalized groups should be consulted when constructing survey instruments and analysis.[19]
- Training in techniques for handling smaller sample sizes in the analysis of disaggregated data, and avoiding sample bias in the use of mobile technologies for data collection.

Fill measurement gaps and reveal barriers and inequalities

Some aspects of human development cannot be fully assessed because they have not been sufficiently captured in data collection and measurement, as with the quality of human development. Likewise, many issues that need to be addressed to expand choices and opportunities for women and girls are insufficiently tracked and measured. For example, in the statistical annex of the 2016 Human Development Report, data are missing for many countries—especially those at low levels of human development—for the share of women working outside of agriculture (missing for 45 percent of countries globally); the proportion of women legislators, senior officials and managers (missing for 41 percent of countries); and the percentage of women receiving pensions in old age (missing for 60 percent of countries). More than three-quarters of countries in the low human development group are missing data on these topics (figure 5). Other important indicators are so poorly measured that they do not show up in internationally comparable tables for lack of sufficient data coverage.

Initiatives are under way to address some of these shortcomings, but they will need to be scaled up to provide a global picture of the challenges women face (box 1), particularly since only 13 percent of countries have a dedicated budget for collecting gender-related statistics.[20]

Another measurement gap has to do with the shortage of data to assess the quality of human development. Differences in the quality of education, health care and livelihoods remain a persistent challenge to advancing human development and there is a need to more accurately monitor progress.

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[20] United Nations. 2014.

Figure 5: Most low human development countries are missing data for key gender statistics (%)
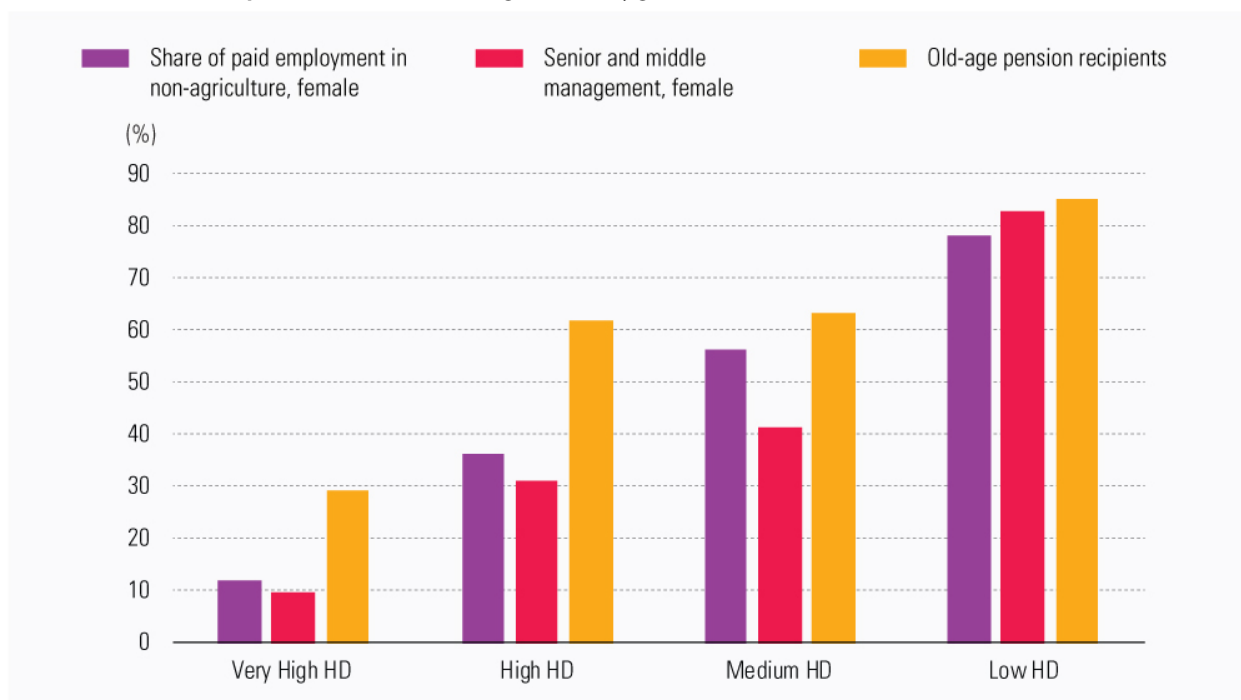
Source: Calculations based on ILO 2017, World Bank 2017 and ILO 2016.

Some initiatives are promising. The Dakar Framework for Action has increased national learning assessments and education quality data across countries at all incomes, particularly in developing countries.[21] Such data enables countries to assess relationships between school and education system characteristics and the quality of learning. For example, in Afghanistan the Ministry of Education has responded to data showing that the quality of educational inputs like teacher training, improved infrastructure in schools and more time in school improve learning outcomes. It is investing in these areas with a focus on training women teachers, which has also increased school enrolment for girls.[22] Where data collection faces extreme barriers, financial or otherwise, it may be possible to explore estimation techniques to fill data gaps.

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[21] http://unesdoc.unesco.org/images/0023/002322/232205e.pdf.

[22] http://unesdoc.unesco.org/images/0023/002327/232702e.pdf.

Box 1: Overcoming gender data gaps

Data on how women use their time and the security threats they face are critical for informing policies to empower women, but both areas are undermeasured. Time-use surveys are an integral source of information on the unequal distribution of paid and unpaid work between men and women—an issue that was highlighted in the 2015 Human Development Report. A comprehensive overview of time-use surveys carried out for that Report compiled the results of 102 publicly available surveys in 65 developed and developing countries. While the results substantiated assumptions that women work more overall than men when accounting for time spent in care work, comparisons across surveys were difficult because the concepts and methodologies used to collect the data varied significantly across countries.[23]

There are efforts to address these challenges. The International Classification of Activities for Time Use Statistics (ICATUS) has been developed by the UN Statistics Division to provide a common framework for activities included in time-use surveys.[24] Broader adoption of the framework could greatly improve the comparability of surveys and the identification of gender inequities in work and other activities.

Despite the importance of addressing violence against women, only 41 percent of countries collect data on the issue, leaving a huge gap in global and national understanding.[25] When data are collected, it is often for women between the ages of 15 and 49. This leaves violence against women married at a younger age and against older women out of the picture. Responding to these deficiencies, the Making Every Woman and Girl Count initiative of UN Women, with support from the Bill and Melinda Gates Foundation, elevates the collection of data on violence against women as a priority along with the analysis of care work. But research and surveys on violence are inherently risky for both respondents and interviewers, limiting data collection. Providing special training for interviewers, ensuring privacy and confidentiality and carrying out interviews in safe settings are essential steps to be taken.

Collect perception data and use them with objective measures

Perception surveys and measures that capture subjective evaluations of life can supplement more objective data and inform decisionmaking. Survey instruments designed to capture perceptions in combination with objective conditions can reveal information that would not otherwise be taken into account, including false perceptions and discriminatory social norms. For example, UNICEF has added questions on attitudes towards wife-beating to some Multiple Indicator Cluster Surveys to help identify where social norms may tolerate or even encourage violence against women.[26]

Ideally, perception data can be collected about a specific service or project to provide additional information for policymaking. For example, in India and Lebanon surveys that assess perceptions of and subjective experiences with local health care providers are used to enhance health care provisioning (in addition to the collection of basic social and demographic data).[27] Such efforts could usefully be replicated in other settings, extending the scope of policy goals and including more voice in public dialogue.

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[23] Charmes 2015.

[24] UNSD 2017.

[25] UN Women 2016.

[26] UNICEF 2016.

[27] Mohanan and others 2011. Cammett and Şaşmaz 2017.

Expand access to data and information

Generating data as the above sections detail is important for human development, but enabling more open access to data once created is equally necessary. People who have access to data have the capacity to make informed decisions and engage in more reasoned public dialogue, so equal and open access to information and knowledge is important for social and political engagement. Actions to expand such access include opening data to a larger population, promoting public–private partnerships for data sharing and investing in data literacy.

Encourage open data initiatives

Public access to data and knowledge is a fundamental part of an open and transparent society, as reflected in SDG 16's target for guaranteeing public access to information. Access to data, meta-data and statistical methodologies can increase trust in public institutions and official statistics, while enabling public monitoring of progress against agreed-on targets. Open data initiatives can support and accelerate academic research that can advance public understanding of such issues as public health and education quality. Published data can also encourage data sharing and reduce overlaps among data collection initiatives across institutions. Data must be easily accessible, available free of charge and published in widely used formats—from the Internet, for example.

The principle of equal and open access to data is already followed by many international organizations and national governments. The United Nations began openly publishing data as early as 2008, followed by the World Bank in 2011 and the European Union in 2012. Over 520 data catalogues from local, regional and national governments are published online. [28] Dozens of governments have committed to publishing the data they produce by adhering to the Open Data Charter, the Open Government Partnership and other regional or sector-specific initiatives like the Africa Data Consensus[29] and the initiative on Global Open Data for Agriculture & Nutrition.[30] These initiatives aim to improve the transparency and accountability of public entities and facilitate innovations in the application of data.

Despite rapid progress by many institutions in publishing of official statistics, not all do so on the same terms or to the same extent. Based on a review of 1,725 government datasets in 115 countries, Open Data Barometer found that only 1 in 10 datasets is fully open even though 79 countries have an open data portal. Fewer than one-third of the accessible datasets are accompanied by metadata or other supporting documentation that would support their use.[31] The coverage of issues also varies, with economic statistics more openly published than statistics on the environment or social issues.[32] Heath, education and environmental data are fully open in less than 10 percent of countries (table 1).

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[28] Data Portals 2017; Open Data Charter 2017.

[29] UNECA 2015.

[30] GODAN 2017.

[31] World Wide Web Foundation 2017.

[32] World Wide Web Foundation 2017.

Table 1: Government data openly available for social policies

Dataset type	Percentage of open datasets published by all governments	Number of governments publishing openly
Health	7	9
Education	8	9
Environment	6	7

Note: Based on 1,725 government datasets in 115 countries.
Source: Open Data Barometer.

Countries at high levels of human development are more likely to publish data openly, but some low-cost initiatives for low human development countries are promising. Rwanda, for example, has used DevInfo as a low-cost data portal for data sharing.[33] The National Institute of Statistics coordinates data sharing among various ministries charged with data collection.[34] Official data are then shared through the open data portal under a fully open terms-of-use policy with indicator-specific metadata. Kenya, Tanzania and Uganda have also recently launched open data portals.[35]

Open data initiatives may not involve heavy financial investments, but they require regular updates and management. And upgrading technologies and building specific capacities require funds, equipment and human resources along with institutional and legislative reforms to address issues of privacy, data ownership and collaboration within the national statistical system. Partnerships between government entities and with the private sector and civil society are often needed to implement the initiatives, with data collaboratives and online platforms for stakeholders to exchange data in a secure digital environment.

Promote public–private partnerships for applying big data to public policymaking

Alternative sources of data, Big Data, offer incredible and yet barely tapped potential for data generation. These sources (social media, news outlets, mobile phone digital footprints, commercial records and so on) have been used for humanitarian and development efforts. For example, digital crisis maps were created during the 2010 earthquake in Haiti from crowdsourced data.[36] And social media has been used in Brazil to assess social stigmas against people with HIV/AIDS that have been barriers to healthcare access.[37] The possibilities for applying digital data to monitor human development and to fill gaps in survey and administrative data is powerful.[38]

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[33] Open Data Watch 2016.

[34] UNDP 2016.

[35] Open Data Watch 2016.

[36] https://www.brookings.edu/blog/techtank/2015/02/19/digital-humanitarians-big-data-and-disaster-response/

[37] https://www.slideshare.net/unglobalpulse/integrating-big-data-into-the-monitoring-and-evaluation-of-development-programmes

[38] As has been the case with many innovations, the collection and application of Big Data are advancing more rapidly than the methodologies, regulations and institutions required to direct these resources toward positive use and the enhancement of human well-being. More attention is needed toward how are they being used, for what purpose, to whose benefit and with what implications for public goods.

Public–private partnerships for data sharing can help governments integrate and leverage private big data. For private companies, calls to share data raise concerns about protecting proprietary information and upholding privacy and security agreements. Still, some firms have provided aggregated and anonymized datasets to governments, researchers and public interest organizations. These data sharing agreements, intended to serve the public good, have been termed "corporate data philanthropy."

The nature of the partnerships between public institutions and private companies will vary greatly by the kinds of data exchanged and the types of public and private institutions (table 2).

Table 2: Public–private partnerships for sharing data[39]

Research partnerships	Prizes and challenges	Application programming interfaces
Corporations share data with universities and other research organizations to analyse social trends.	Companies make data available to applicants who compete to design innovative solutions using available data.	APIs facilitate interaction between different information systems and allow developers and others access to data for product development, testing and data analytics.
Examples		
Safaricom, one of Kenya's leading mobile phone companies, shared a year's worth of anonymized phone data with Harvard researchers to examine how migration patterns were connected to the spread of malaria in Kenya.[40]	In Côte d'Ivoire and Senegal, Orange Telecom hosted the D4D challenge, which granted researchers access to anonymous data samples to compete to address various development challenges in health, agriculture and transport.[41]	Clever allows schools to share their information systems with outside developers.[42]
Intelligence products	**Data cooperatives or pooling**	**Trusted intermediaries**
Companies share data that provide general information about customer demographics and market conditions along with other broad trends.	Corporations and other important stakeholders such as government agencies develop collaborative databases in which they can share data resources.	Companies share data with a few partners.
Examples		
The Ethiopia Commodity Exchange is an organized marketplace that provides small farmers access to reliable price information and information on industry standards.[43]	The United States Agency for International Development has established a development data library with data on more than 1,600 partnerships with businesses, governments and non-profit bodies from across the agency.[44]	Twitter provided the United Nations Global Pulse initiative access to its data tools to support efforts to achieve the SDGs.[45]

Source: Data Collaborative.

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[39] The six types are based on http://datacollaboratives.org/static/files/data-collaboratives-intro.pdf

[40] https://www.hsph.harvard.edu/news/press-releases/cell-phone-data-malaria/

[41] http://d4d.orange.com/content/download/43330/405662/version/3/file/D4Dchallenge_leaflet_A4_V2Eweblite.pdf

[42] https://techcrunch.com/2013/12/05/clever-10m-sequoia/

[43] http://www.ecx.com.et/

[44] https://blog.usaid.gov/2014/10/announcing-usaids-open-data-policy/

[45] http://datacollaboratives.org/cases/un-global-pulse--twitter.html

Data partnerships like these can enable governments, research institutes and individuals to access big data. Data from Safaricom in Kenya enabled researchers to estimate and visualize migration routes that contributed to the spread of malaria, thereby helping to cut down transmission. The winning team in the D4D competition in Côte d'Ivoire and Senegal created a model that simulated how millet prices respond to high transportation costs and information asymmetries, thus making markets more transparent. Global Pulse's access to Twitter data have been used to measure the impact of public health campaigns, track rising food prices and prioritize humanitarian needs after natural disasters. By smoothing the connection between schools and developers, Clever has allowed companies to use data to build learning tools that can improve the quality of education overall. The Ethiopia Commodity Exchange is helping to reduce transaction costs and increase access to information in the agricultural sector.

Encouraging companies to share data requires enhancing the benefits and reducing the risks of these partnerships. Establishing standards for data security and data quality, and clarifying legal gaps and stakeholder incentives can minimize the risks. Benefits to private companies should be emphasized, including valuable research insights, enhanced public image, revenue generation from the sale of data and a culture of corporate social responsibility.

Build data literacy among policymakers and the public

The quantity of data and information that individuals and policymakers face every day is enormous. Data are communicated through the filters of social media, corporations, governments, universities, news media and various other platforms, sometimes with conflicting messages. Against this data cacophony, making informed decisions and determining which sources of information to trust can be overwhelming even for those with a high capacity to evaluate the quality of evidence. At the other extreme are "data deserts" surrounding those without access to the Internet or a mobile phone.

The dominance of social media for accessing information and engaging in public dialogue presents additional risks. "Filter bubbles"—algorithms that determine the type of information a person prefers—limit exposure to information that might challenge perspectives or expand worldviews. Sharing information on social media also risks the "echo chamber" that limits public dialogue to interactions between those with like-minded views.

Education that imparts data literacy skills can inform deliberative debate – especially if digital divides begin to close - and as quantities of information continue to increase. The level of proficiency needed in different data skills will depend on an individual's engagement with data and technology, but minimally all people need to be able to critically consume and interpret information that has been processed by governments, private companies and media institutions (figure 6). Building these skills across a population calls for governments to invest heavily in specialized education, training and technology.

Figure 6: Essential skills for building data literacy

Approaches to teaching statistics need to adapt to the shifting demands of navigating a complex world by focusing on analytical thinking and knowledge application beyond mere calculation. Traditional models of teachers as experts imparting knowledge to passive learners are not the most effective ways of promoting data literacy. Instead, students need opportunities to collect their own data and analyse local social issues most important to them. In such project-based, problem-driven and culturally relevant models, teachers are mentors guiding students in their exploration.

Coding courses are now offered in schools and nongovernmental organizations, with some targeting groups most likely to be left behind in the digital revolution. Code for Cape Town, a South African nonprofit, offers courses for high school girls, to encourage diversity in the African technology industry.[46] In the United States, Code2040 aims at tackling gender and racial divides in the industry by providing training to African-Americans and Latinos.[47] Other interventions build data literacy more broadly in society (box 2). The efforts should be expanded to improve the understanding and application of data and evidence in decision-making.

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[46] Innovate South Africa 2017.

[47] Code2040 2017.

Box 2: Building data literacy with StoryLab

StoryLab Academy is a joint initiative of Google News Lab, the World Bank and Code for Africa to empower journalists across Africa to use open data and the technology available to them on the Internet for reporting and storytelling. Through in-person training on topics ranging from investigative data analysis to digital fact-checking, freely available massive open online courses, and study groups offering focused in-person instruction, the StoryLab Academy plans to train thousands of journalists across the continent. Through the initiative, reporters have already begun using their new skills to piece together, investigate and triangulate their data to produce findings that reveal local challenges such as poor sanitation affecting educational outcomes.

Uphold human rights in the data age

Collecting and disseminating data, especially on sensitive topics in disaggregated form, must be matched by strong systems of nondiscrimination and human rights protection. Such systems would prevent discrimination linked to data collection, adopt strong privacy protection and empower individuals to use data as a tool for holding states accountable for protecting their rights.

Ensure that policies are in place to prevent data-based discrimination

Identifying group-based deprivations with disaggregated data is an important first step. But these same data can also be misused to identify and then discriminate against, rather than assist, marginalized groups.

People may not want to admit to belonging to some marginalized groups. If strong antidiscrimination laws are missing, and if human rights are violated with impunity, efforts to collect disaggregated data are unlikely to be successful and could endanger some groups (box 3). Reporting oneself as living in poverty, living in a slum, having a disability or being from a particular region can also put individuals at risk of social stigmas and/or potential legal infringements. Some historically marginalized ethnic groups opt not to self-identify for fear of further exclusion. Household surveys and censuses often greatly underestimate the Roma population, for example, limiting the data for informing policies to reduce discrimination against them.[48]

A focus in data collection on the most marginalized, and frequently the most vulnerable, requires measures to ensure that survey participants are protected from discrimination, and that data are not misused to encourage further discrimination. UNICEF and the Office of the United Nations High Commissioner for Human Rights have guidelines for ethical standards in data collection and analysis. Both prioritize participation from vulnerable groups, stressing that they are best suited to identify data needs and to help test appropriate collection methodologies. There are also calls for involving national human rights institutions if they can represent groups' interests. In both cases, privacy and the ability to explicitly and transparently ensure the privacy and safety of survey

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[48] Milcher and Ivanov 2004.

participants is of utmost importance.49 Practical measures for ensuring that data are confidential include separating identity from content material, devising plans for handling breaches of confidentiality, impressing on all data collection staff the critical importance of confidentiality, and limiting information about survey sites and samples that could be used to identify participants.50

Box 3: Barriers to collecting disaggregated data on the HIV/AIDS population

Individuals living with HIV/AIDS may, in some societies, be excluded from work, school or health services. Half of all respondents in a 2010 study by UNAIDS experienced high levels of HIV-related stigma and discrimination, with one-third reporting loss of employment, refusal of health care or involuntary disclosure of their health status.51 In 2014, 64 percent of countries reporting to UNAIDS had some form of legislation to protect people living with HIV from discrimination, but 72 countries still had laws that prosecute people living with HIV for a range of offences.52 Under these conditions, data collection can put respondents at risk of social isolation, poverty and imprisonment. This social and legal context severely curtails the ability of survey instruments to capture the population living with HIV/AIDS and the challenges they endure. Thus, it is difficult to make policies that address the barriers that this group faces.

Ultimately, ensuring that data are not misused requires global and national commitments to building inclusive and accountable institutions that uphold human rights and ensure access to justice for vulnerable groups.53

Adopt mechanisms for privacy protection

Data collected in household surveys or censuses are, in most countries, regulated by statistical legislation that protects the privacy of participants. But open data initiatives and the increased use of big data introduce new concerns over the privacy of individuals when security protocols, guidelines, laws and regulations may not be in place, and when Internet access increases the circulation and availability of data. The compilation of the digital footprints and character profiles of entire populations could be used to discriminate and stigmatize. Cross-referencing the pieces of digital information can identify people who should otherwise have remained anonymous. In some cases, it is possible to deduce sensitive personal information such as political affiliation or sexual preference.

Even with careful standards of collection and storage, the possibility of de-anonymization, or use of data without direct consent, could have awful consequences for some people, especially as the

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49 UNICEF 2015.; UNOHCHR 2016.

50 InterAction 2003.

51 UNAIDS 2010.

52 AVERT 2017.

53 The following mechanisms were highlighted in the 2016 Human Development Report: human development for all entails a full commitment to human rights and strong national human rights institutions with the capacity, mandate and will to address discrimination and ensure the protection of human rights across multiple dimensions; equal access to the courts and other institutions involved in enforcing the law is important; and legal empowerment and knowledge are essential, so that people can claim their rights.

size and frequency of cyber-attacks have been increasing. In 2016 for instance, data from more than 1 billion Yahoo user accounts was compromised by the biggest data breach in history.

It is possible to de-identify data so that it can be provided publicly for research and analysis by removing part of the information, such as the last three digits of a five-digit postal code. In the United States de-identified data from a private health insurance provider is used to produce a health index measuring the health conditions of commercially-insured Americans at the local level.[54] Data can also be semi-open, published only for selected users and purposes through licences and restricted access.

Even with these options to increase protection they are often piecemeal, and it is hard for individuals to know the extent of protection offered across different data collectors. Hence the need for regulations to prevent violations of human rights and privacy, and to address data ownership (box 4). More widely, cooperation between governments, educational institutions and the media is encouraged to protect citizens' rights to information and privacy.

Box 4: Big data issues and the EU General Data Protection Regulation

The EU General Data Protection Regulation, adopted in April 2016, took effect in May 2018.[55] It seeks to reform the 1995 Data Protection Directive and to regulate the processing, management, protection and ownership of personal data in the EU. The new regulation, which has the potential to become a global standard, aims to put individuals in charge of their personal information and will effectively prevent gathering data without an individual's direct or explicit consent. It regulates the processing of personal data by entities in the EU, regardless of whether the processing is in the EU or elsewhere. It also applies to the processing of personal data of EU citizens by entities not established in the EU. Organizations may be fined as much as 4 percent of global revenues or €20 million for a breach (whichever is greater).

Empower individuals to use and generate data for greater accountability

Self-determination and participation are bedrocks of human development. Engaged citizenry with the tools to effect change—especially for groups most at risk of being left behind—is an essential force for advancing human development for everyone. Enabling people to participate in their own development, decide on their own priorities, monitor results and hold decisionmakers accountable for results ensures that policies are tailored to the needs of the population, and increases the sustainability of their impact. Encouraging people to contribute, individually or collectively, expands resources for development and advances innovative solutions.

People's participation is an asset for development, but it is also valuable in itself. People value the capacity to influence their own lives and those of their communities, locally and globally. The United Nations global citizen survey "My World" received nearly 10 million votes from individuals. They ranked 16 areas for development, corresponding to the SDGs. Political freedoms appeared more important than phone and Internet access or freedom from discrimination and persecution. Having

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54 Blue Cross Blue Shield 2017.

55 European Union 2017.

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an honest and responsive government was among the top priorities, only after education, health care and employment.56

The SDGs and similar national commitments have opened opportunities for empowered citizen groups. The data generated to monitor progress towards the SDGs can be harnessed by such groups to identify barriers and bottlenecks and to hold states accountable for meeting their political commitments.

Empowering people to use data can encourage their participation in public dialogue and can increase the accountability of governments to take actions to improve the lives of citizens. Local initiatives, like community scorecards, help to monitor and rate the quality of health care, schools, public infrastructure and other services. These types of activities not only provide useful feedback and information to policymakers about the impacts of programmes; they also provide a way for individuals to engage with policymakers and make their voices heard.57

Rely on evidence to inform decisions

The SDGs, the advances in big data and the proposals for new ways of measuring human development are part of a movement towards more comprehensive and detailed evidence that can inform policymaking. But better evidence is not enough to influence policy change. Political and institutional circumstances are as important. And in a "post-truth world," the challenges for turning evidence into policy are, paradoxically, increasingly high. This is reflected in the ways the public understands trends that affect government decisions. In the United States, for example, data show that homicides have followed a downward trend since the early 1990s, but perception surveys show that the public believes that crime has been increasing in recent years (figure 7).

Dialogues among politicians, the media and the public that draw on anecdotal experience, discriminatory beliefs or cultural norms and fears can lead to policy actions that are not only in opposition to sound evidence and research, but that also perpetuate exclusions and human development inequalities. So data, measurement and research initiatives must promote evidence-based thinking and decisionmaking. How then, to strengthen links between evidence and actions? By promoting the use of targets and indicators in policy agendas and national development plans. By building evidence-based cultures of decisionmaking and by working with research institutions to communicate research findings to a broader audience. That requires investments in data literacy, discussed earlier.

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56 United Nations 2017. "MY Analytics."

57 Subjective feedback should be combined with objective measures to ensure unbiased assessments of policy impacts.

Figure 7: Evidence and beliefs do not always match
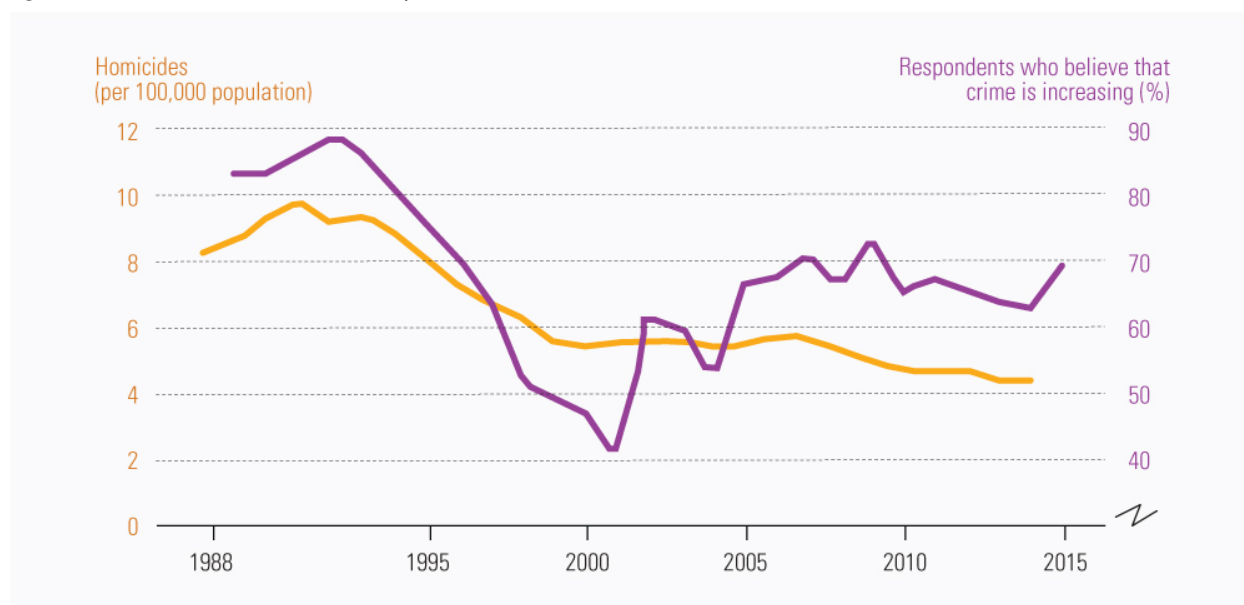
Source: *The Economist* 2016.

Use targets and indicators in policy agendas and national development plans

Measurement innovations and targets at the global level can influence national policy debate and statistical activities; and shift national planning attention and resources toward human development including for vulnerable and marginalized groups. The HDI communicates a relative standing in the world based on three essential aspects of human well-being. The Inequality-adjusted HDI, Multidimensional Poverty Index, Gender Inequality Index and Gender Development Index communicate degrees of inequality, poverty and gender inequality in human well-being. Performing relatively well or relatively poorly against other countries on these indices, or failing to advance toward international targets like the SDGs and the MDGs, can motivate policy changes, either from direct government attention or from civil society group advocacy.

Many countries are already incorporating the goals of Agenda 2030 into national budgets and development plans. Through voluntary national reviews, governments of Colombia, Egypt, and Georgia have identified goals that reinforce their development priorities. The Philippines, Samoa, Sierra Leone, Turkey and Uganda have highlighted aligning the SDGs to their national sustainable development strategies. Switzerland and Turkey are carrying out gap analysis to identify new priority areas for action. Finland, Germany and Norway have committed to addressing their own national challenges and have planned initiatives to support other countries in achieving the SDGs.[58]

Human development reports (global, regional and national) and indicators like the HDI draw the world's attention to important issues and instil competition and awareness among policymakers

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[58] UNDESA 2016. "Synthesis of Voluntary National Reviews."

and civil society to improve human development performance. More than 700 national Human Development Reports have been published in 145 countries. These reports have produced disaggregated human development measures and compiled new indices, for example on human security in Nigeria. And they discussed human development in relation to issues of importance in national contexts, including youth empowerment, climate change vulnerability and migration, to name just a few.

The data and analysis in these reports have often drawn national attention to human development, and motivated policy responses. Uganda's 2015 National Human Development Report generated baseline data on human development conditions and challenges in the northern part of the country, which is recovering from decades of civil war, and its analysis informed the National Poverty Reduction Strategy for post-conflict areas. Vietnam's 2015 National Human Development Report on inclusive growth quantified multidimensional poverty by region, rural/urban split, income quintile and ethnicity to reveal wide variations in poverty headcount and HDI between geographical areas (figure 8). Based on these findings, the report suggested revisions to national social protection schemes to reach poor and marginalized groups, especially in the poorest regions.

Figure 8: Poverty headcount and HDI by region in Vietnam, 2012
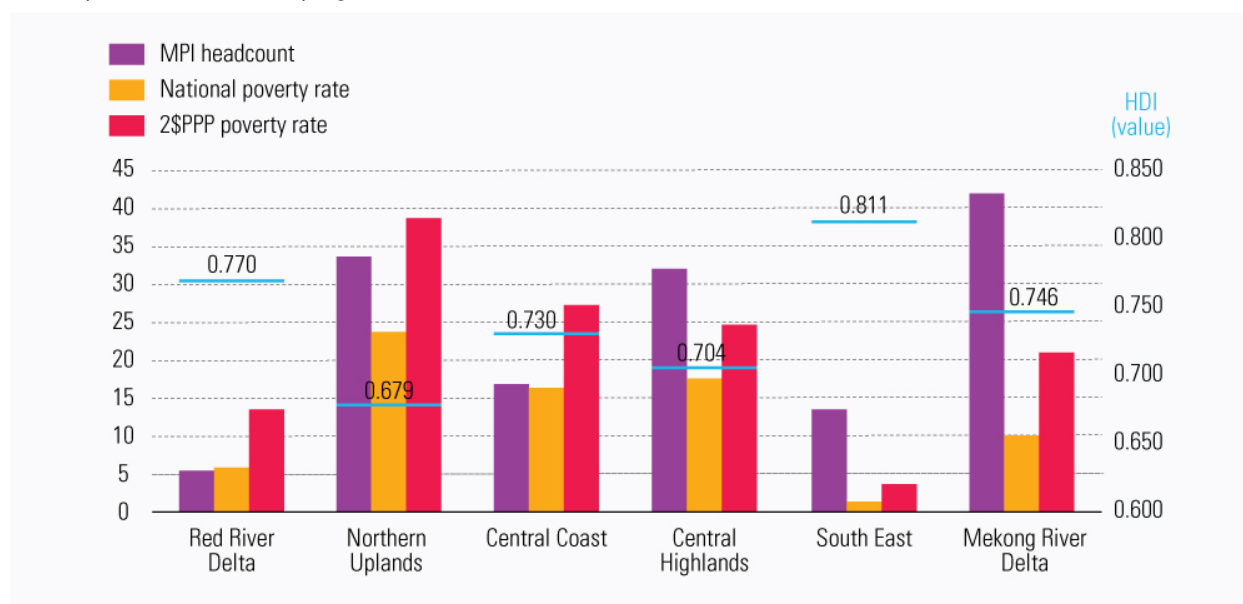
Source: UNDP 2015.

These reports are important links between the global agendas formed around targets and indicators (which generate focus on major topics), and national action agendas (which require more context-specific planning, action and measurement).

Invest in a culture of evidence-based decision-making

Public policy is complicated, exacerbated by challenges of data illiteracy and public mistrust of authorities, science and research. Setting aside whether enough relevant data are in hand, the problem becomes how best to amplify the role that evidence plays in decisionmaking.

Strengthening the ties between knowledge and policy requires the use of evidence as a central plank in public policy dialogue, for decisionmakers and practitioners at all levels, and for civil society. This approach is similar to building data literacy, but goes deeper in that it supports a culture where data are not only understood, but are the priority tool in making decisions. There are promising efforts in several countries to build knowledge-sharing networks among different actors, and integrate evidence more deeply into decisionmaking structures (box 5).

Box 5: Building a culture of evidence based decisionmaking—some examples

The Sudan Evidence Base and Data Literacy Capacity Development Programme sponsored by the World Bank is encouraging. It focuses on capacity development for data collection and use, and extends beyond statistical offices by bringing data producers and users together, including journalists, civil society members and academic researchers.

Indonesia's National Development Planning Agency, with the Australian government, initiated a 15-year programme to improve the use of research, analysis and evidence in policymaking. The project focuses on building the capacity of Indonesian research organizations, improving communication between research groups and policymakers, and building networks of civil society organizations that incorporate high-quality data into their advocacy work.[59]

In Ghana, South Africa and Zimbabwe, the VakaYiko Consortium was established to build national capacities in the use of evidence for policymaking. The initiative has established courses on evidence-informed policymaking at the civil service training college in Ghana and at key ministries in Zimbabwe; and has established institutional mechanisms for policymakers to articulate their research needs in South Africa.[60]

The cost of producing data is sometimes deemed too large relative to the perceived benefits of having better information, and this view can reduce support for evidence-based policymaking. Indeed, when data that do not match the policy priorities of governments or civil society are produced, the data investments can seem wasteful. But when data collection and research are targeted towards policy priorities, better evidence can generate cost savings in the long run. In short, solid evidence makes for more cost-efficient public policy.

Responding to concerns about the costs of data collection, a task force organized by the United Nations Economic Commission for Europe stressed that official statistics can be produced at low cost and, as a public good, be an efficient use of resources, especially when data are publicly available to all potential users.[61] In New Zealand one dollar invested in census and population statistics generates a net benefit of five dollars to the national economy.[62] And investing a pound in education statistics in the United Kingdom resulted in a 0.1 standard deviation increase in PISA test scores. Based on OECD estimates of the relationship between PISA test-score increases and gross domestic product, every pound invested in collecting education statistics returns 16 pounds for the economy.[63]

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[59] ODI 2017.

[60] ODI 2016.

[61] UNECE 2017.

[62] Bakker 2014.

[63] PARIS21 2016.; OECD 2010.

Enhance data and research communication strategies

Data and evidence are unlikely to have an impact on behaviour and actions to enhance human development unless communicated in a clear, easily understood way. In addition, given the sheer quantities of information people are exposed to, with competing, apparently compelling, messages from different sources, and the shorter attention spans this exposure generates, data and research findings have to be communicated to the public in ways that are bold and immediately engaging, even exciting.[64] They need to capture the public's interest and generate curiosity and a desire to act on the information.

Simple graphics can do just that. Figure 9 shows that women spend more time in work related activities than men, but spend less time in paid work and more time in unpaid work. It is easy to read and process, and may provoke a policy response or call for action among those who see it.

Figure 9: Communicating a clear message – Women spend more time working for less pay
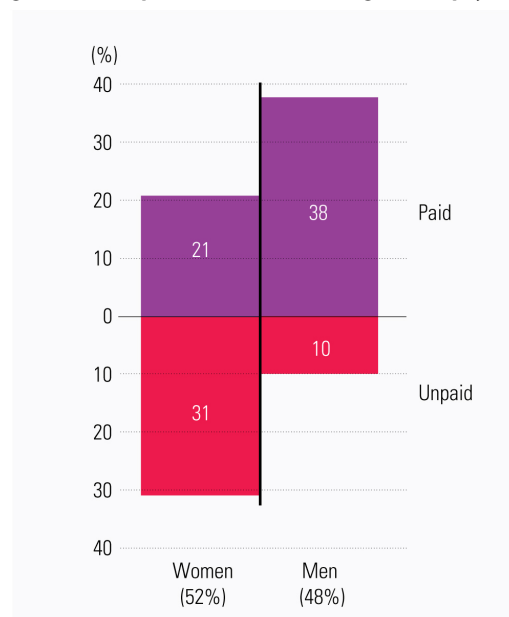
Source: UNDP 2015.

Greater availability of disaggregated data, better data on dimensions of well-being that are missing for many countries, and more perception data will allow for even stronger analysis of challenges to advancing human development. Communication strategies and innovative visualizations of data and analysis will be vital for sharing the trends and messages stemming from this new age of data generation.

But more information and data do not automatically lead to more informed citizens. Conflicting messages and results, and the overwhelming onrush of information, can cause some individuals to question the validity of evidence and rely on their instincts and perceptions. Data visualization

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[64] Ahn 2014.

initiatives like Gapminder challenge preconceived notions and cause people to assess their beliefs more critically (box 6).

Box 6: The "Gapminder Effect"

In the early 2000s Hans Rosling, a Swedish professor known for his work on health and statistics and for his promotion of the use of data to explore development issues, carried out a test among his students to evaluate their knowledge of health improvements in Asia. The results were disastrous, showing that in most of the cases the students' answers were based on preconceived ideas with no grounding in evidence. Together with Ola Rosling and Anna Rosling Rönnlund, he created the Gapminder Foundation in 2005 to "fight devastating ignorance with a fact-based worldview that everyone can understand." The Foundation developed the Trendalyzer, software that presents data through animated and interactive graphs, and launched the Ignorance Project to investigate people's misconceptions of basic global trends.[65]

In 2013 the foundation conducted a survey asking Swedish people about global development trends in such areas as life expectancy, poverty, population and the share of girls who complete primary education in low-income countries. The results were, again, not encouraging: fewer than a quarter of the respondents knew that the share of people living in extreme poverty had been halved in the previous 20 years.[66]

The Foundation then developed teaching materials to make the learning process easy and fun, through animated presentations and card games. In 2017 a follow-up survey showed the impact of these efforts, or the "Gapminder Effect." The share of respondents knowing that 80 percent of one-year-old children have been vaccinated against some disease, for example, rose from 22 percent in 2013 to 27 percent in 2017. Nearly half the people who gave a correct answer reported learning this information through Hans Rosling or Gapminder Foundation.

The Data Lab at the Massachusetts Institute of Technology is also advancing data visualization tools, foremost through Data USA, an online platform that uses government data to make it easy to visualize issues facing the United States in areas like jobs and education, and at different levels of disaggregation.[67] Google's Public Data Explorer offers the ability for anyone to visualize relationships and trends in datasets provided by international organizations including the World Bank, OECD, and Eurostat.

More efforts are needed to make official statistics accessible through visualization platforms that can involve individuals in data assessment and analysis by allowing them to explore the issues, trends and relationships that are important to them. This can introduce greater transparency to analysis and messaging, while encouraging curiosity and critical thinking about "evidence."

<p align="center">*   *   *</p>

The availability of data and information has surged exponentially since the first Human Development Report was published in 1990. And the metrics to track human development progress since then have revealed great gains in human well-being. But there still are shortcomings in every country.

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[65] Gapminder Foundation 2017. "The Ignorance Project."

[66] Gapminder Foundation 2017. "The Gap Minder Effect has been measured!"

[67] Data USA 2017.

Agenda 2030 marks a renewed commitment to global cooperation and action towards leaving no one behind. This commitment can be harnessed to fill data gaps, shift views towards data and knowledge as public goods, and instil a greater focus on evidence as a foundation for public deliberation and policymaking. At the same time, more refined data increase the risks of misuse. Protecting vulnerable groups and committing to uphold human rights and ending all forms of discrimination are more essential than ever.

Even with extensive efforts to refine data tools, measures and statistics will not capture all the complexities of human life. Working towards empirical goals and making sure that trends are going in a positive direction is a part of development. But attachments to measurement can limit the scope of the world we see and the problems we tackle. Engaging people, and allowing them to tell their stories, especially those who have not had a full opportunity to voice their concerns and needs, is equally important.

All these issues are still evolving, and we are yet to appreciate their ramifications. With new opportunities and emerging challenges, there is a need for more exploration, further research and additional work on the human development framework and its measurements—with a focus on advancing human development and leaving no one behind. Progress here would extend the frontiers of our knowledge, expand the horizon of our understanding, and provide incentives for more thinking and visions.

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