



# Data Practices and Sustainable Development Goals: Organising Knowledge for Sustainable Futures

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[I]mproving data is a development agenda in its own right.  
—*A World that Counts*, Report of the UN’s Secretary-General’s  
Independent Expert Advisory Group on a Data Revolution for  
Sustainable Development 2014

A good indicator of a region’s poverty or underdevelopment is a lack of  
poverty or development data.  
—Letouze (2015)

In May of 2019, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) published a Global Assessment Report, which stated that one million species are at risk of extinction in the coming years (IPBES 2019). One of the prominent reactions to the report on the part of policy-makers, researchers, and other stakeholders, was to question how the IPBES could possibly know this. Other global assessments, whether about the state of ecosystems, energy reserves, climate change or GDP measures, and level of development, have also been the object of debate about whether we can act on the basis of these technical reports. Strikingly, the global scale and urgency in these debates is increasingly articulated around the knowledge

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infrastructures that yield the data needed to formulate, address, and monitor progress on global environmental problems and the alleviation of human hardship. Prominent examples of global objects are the average rise in temperature, the number of people living in poverty, or the amount of renewable energy produced worldwide. Knowledge infrastructures and the digital data flows they foster are therefore important loci of analysis, since they solidify how problems are formulated, orient to possible solutions, and legitimise and support specific actors while excluding others. In this chapter, anthropology of technology, in combination with science and technology studies and development studies, is used to foster a rich understanding of digital data practices and associated technologies. These include the accountability and inequality that are constituted by knowledge infrastructures.

The emerging technologies considered in this chapter—while generally falling under the label of ‘digital’—range from the very small, portable, and even intimate (a mobile phone in the Global North) to the highly distributed and remote (satellite data, internet infrastructure). Importantly, these technologies are also largely configured as individual, corporate, global, and ongoing (‘real-time’). They are furthermore deployed and valued in contrast to another complex set of technologies of public bureaucracy for state knowledge, usually based in national statistics offices (NSOs). The technologies used by NSOs are document-based, ordered according to temporal cycles for data gathering, review, and release (annually or five-year census cycle), and aligned to nation states. These different logics of evidence and their associated technologies merge, clash, and compete in the project of knowing about global objects. In both cases, the technologies are best understood as assemblages, suites of technologies articulated as knowledge infrastructures with a particular evidence-gathering logic (de Rijcke and Beaulieu 2014), rather than as separate or stand-alone ‘tools’.

In this chapter, I focus on the knowledge practices enacted around a specific set of global objects, the Sustainable Development Goals (SDGs), to better characterise recent changes in the relationship between digital technologies of measurement and accountability mechanisms. The aim is to use anthropology of technology to provide insights into the data-intensive practices around knowledge infrastructures, and to problematise the novel uncertainties and inequalities that result from these changes.

## DATAFICATION AND PROLIFERATION OF DATA

In the creation of global objects, the foregrounding of data is an important trend. This is overwhelmingly presented in public discourse as simply taking advantage of the data that is now available (Mayer-Schönberger and Cukier 2013). But this ‘simple’ use of ‘existing’ data is supported by a complex process of datafication (Dijck et al. 2018). The extension of automation, with the proliferation of digital technologies, the willing production of massive amounts of data, and the combination and circulation of data sets are all crucial

components of datafication (Rieder and Simon 2016; Dijck et al. 2018; Beaulieu and Leonelli 2021). Datafication ‘turns into data’ many aspects of the world and of our behaviour that had not been formalised before, and renders activities quantifiable traces in which patterns can be discovered and future behaviour predicted. Datafication is best understood according to a layered model that puts neither data nor technology at its centre. It links at least four essential elements: the community that engages with data, forms of care, capacities to handle data, and data itself in its many forms (Beaulieu and Leonelli 2021). Datafication intersects with many core concepts of anthropological analysis, revealing the importance of understanding its dynamic in conjunction with commodification (Dalton and Thatcher 2015), identity (Beduschi et al. 2017; Zwitter et al. 2020), post-colonial relations (Cinnamon 2019; Couldry and Mejias 2019), remittance (Rodima-Taylor and Grimes 2019), and surveillance and control (Taylor 2016). To warrant this seemingly self-evident use of available data, data had to become part of socio-cultural practices (Rieder and Simon 2016) and integrated into our social epistemology (Jasanoff 2003)—socially supported and accepted ways of knowing.

### SITUATED MEANINGS OF DATA TECHNOLOGIES AND DATA WORK

In this context of datafication, individuals create data in daily life through their interactions with networked and mobile data devices. This data is used to produce global objects. The meanings of data technologies and of their uses are situated and multiple, as scholarship in anthropology of technology reveals. A device like a mobile phone can be an intimate possession, used to quantify the self, and to integrate and manage ongoing intimate relationships. It can also be a common possession that is casually shared. In the first case, the connection of the technology with an individual self will be a valid assumption. In the second case, it will not, as Erikson’s analysis of mobile phone use in Sierra Leone powerfully demonstrates (Erikson 2018).

Furthermore, anthropology of technology approaches is also essential to maintaining a critical stance towards technology use and to keep questioning the filters through which Global North actors see the relation to technology of Global South actors. For example, in studies of the Global South users, ‘their new media practices are predominantly framed as instrumental and utilitarian, partly because development agendas drive this research with a strong historical bias towards socioeconomic impacts’ (Rangaswamy and Arora 2013). The result is a greater emphasis being placed on farmers checking crop prices online than watching pornography on their mobile devices (Arora 2016). This body of work contains important exemplars to help understand meaning as situated and to avoid making universalising assumptions about data-producing technologies.

An anthropological approach also keeps the researcher alert to the role of data, beyond seeing it as an empirical representation of the world. This can help us understand why data is generated, even when the production and

compilation of data are already known to be incomplete and uncertain, or to form an undue burden (Sullivan 2017). Data can constitute a strategic resource when fulfilling requests from aid agencies for compliance or preparedness, or may signal accountability and transparency (Sullivan 2017). Such data works for symbolic purposes can divert energies to ‘performing’ data, at the expense of primary care and the development of a health system on the ground (Erikson 2019). In addition, in the face of discussions of global data where large-scale and centralised systems dominate, ethnography can help draw attention to local work and to how the ‘local level’ is not merely a recipient of data services, but also an active participant (Baker and Karasti 2018). Finally, where data literacy approaches frame digital inequalities as being about insufficient access to technology or lack of skills, an anthropology of technology approach helps address the emerging inequalities of data-intensive societies, questioning not only access to the digital, but the very constitution of the digital itself (Cinnamon 2019).

### INFRASTRUCTURE AND DATA FOR POLICY

When decision-makers use digital data to make decisions about global objects, they enact different lines of accountability. If they call for new sources of data and ways of knowing—for example, ‘Big Data for Development’—then new actors may enter the stage or existing actors take on different roles. The current situation, in which data plays a compelling role in guiding international policy and enhancing trust in the policy-makers and their decisions, is the result of complex historical processes (Shapin 1994; Porter 1995). Increased formalisation, quantification, and automation accompany the use of data as evidence (Beaulieu 2001, 2004), at the expense of expert interpretation and deliberation. In the second half of the twentieth century, global objects have emerged in relation to the growing importance of international negotiations and global political organisations such as the United Nations (Miller 2004). As these objects were articulated through data infrastructures on the planetary scale (Beck et al. 2016), the corresponding mechanisms of accountability were also realigned. Anthropological and historical work has shown how a focus on data practices can serve to challenge consensus, nourish controversy, and politicise issues (Oreskes and Conway 2011), or support obfuscation in order to delay action (Proctor 1995). An ethnographic approach shows how transforming data practices can contribute to contestation or confirmation of engagements with what is known (Gabrys 2016), or not known, in a way that is not innocent (Guston 1999).

### DATA AS EVIDENCE AND TECHNOLOGIES OF ACCOUNTABILITY

When policy-makers favour particular kinds of evidence, they also tend towards particular kinds of solutions. This means that risk and vulnerability also change, depending on which kind of evidence is selected. Work in anthropology of

health and in development studies has thoroughly examined the focus on atomistic evidence for global health, and the damaging side effects of measurements, metrics, and data infrastructures (Adams 2016). A focus on measurable interventions, using the tools of statistics and an emphasis on metrics, leads to counting single variables and is best suited to evaluating interventions that address a single target (Adams et al. 2014). This ignores the messiness of local situations and tends to focus on solutions and innovations that take on discrete forms, such as products or drugs—in contrast to systemic change, new practices, or relationship-based interventions. Hypothesis-driven research also imposes quantitative metrics that have a logic of anticipation, since it excludes any other types of data that might arise as it does not fit the pre-ordained design (Adams et al. 2014). This is why it is so important to analyse practices of data production, sharing, aggregation, and circulation. They show the networks of power, and reveal that classifying the world and providing evidence for ‘what works’ (Pigg et al. 2018) are complex accomplishments.

A recurring theme in this body of work is the valuation that accompanies the production of documentation as evidence and the associated entwinement of technology and accountability. This can result in an audit culture (Strathern 2000). Such a culture includes a combination of physical, institutional, and conceptual aspects that value ‘productive’ activities, requiring productivity and self-description that are limiting and come at the cost of activities that do not fit into auditable returns (Strathern 2000). This growing trend (Rieder and Simon 2016) has been labelled a corporatisation of governance (Merry 2011) or the rise of the technocratic (Turnhout et al. 2019), all dynamics tied to ‘high-modernism’ (Turnhout et al. 2016). Policy-makers increasingly face demands for a demonstrably auditable basis. The phrase ‘evidence-based policy’ abounds in documents on global objects, including the SDGs, to which we will now turn. While this phrase can seem innocuous or even undisputable (who will argue in favour of evidence-free policy?!), this language does point to the foregrounding of technical expertise and the backgrounding of political debate in policy-making. If policy-makers require evidence to act, and if digital data on a global scale is considered the best way to provide evidence, it follows that much attention and funding goes into developing the specific types of knowledge infrastructures that rely on datafication. I examine how this relationship develops around the SDGs in the rest of this chapter.

## DATA PROMISES FOR THE SUSTAINABLE DEVELOPMENT GOALS

A prominent instance of the intersection of global knowledge questions and datafication is found in the Sustainable Development Goals (SDGs) formulated by the United Nations in 2015 in the declaration *Transforming our World: the 2030 Agenda for Sustainable Development*. The declaration elaborated on the Millennium Development Goals set in 2000, a global anti-poverty effort,

generally considered in development and governmental circles to have been largely successful. With the aim of guiding policy for the following fifteen years, the *2030 Agenda* formulated seventeen SDGs. The underlying reports, and subsequent communications, are full of formulations that stress the interrelated and global nature of the issues targeted by the goals. The declaration speaks of ‘global Sustainable Development Goals’ and of ‘universal and transformative Goals and targets’ (United Nations 2015), while the latest annual report insists that these are ‘global problems that require global solutions’ (United Nations 2019). UN documents widely call for evidence-based policy and tie this appeal to the powers of a ‘data revolution’ (United Nations 2018).

In what follows, I analyse the various emerging assemblages that various agencies develop in order to provide the knowledge needed for the SDGs, while also problematising this need. These assemblages are born out of aspirations for better data and are often framed in terms of remedying the shortcomings of current knowledge infrastructures. The present chapter arises from line of work being developed at Campus Fryslân, University of Groningen, the Netherlands, to contribute critically to better knowledge infrastructures for sustainability. As such, it is a mapping exercise to situate dynamics around knowledge infrastructures and to identify possible sites of interventions and experimentation. This case is an analysis of the knowledge base for the SDGs, as articulated by the UN-focused international community leading SDG efforts. It covers the two years prior to the launch of the SDGs and the first five years of their operation (2015–2019). To understand the assemblages called for and set in place for the SDGs, I analysed reports, presentations, interventions, design meetings, recommendations, and critiques that address the knowledge needed for the SDGs and how it is to be generated. Methodologically, this chapter is based on fieldwork in the context of SDGs, in which data, infrastructures (Wouters and Beaulieu 2006; de Rijcke and Beaulieu 2014), and documents (Riles 2006) are seen as actions as well as things, and where social ends and the material organisation of processes intersect (Riles 2006; Pigg et al. 2018). I treat databases and data flows for the SDGs ethnographically, and consider how reporting and monitoring practices are sites of negotiation and shaping that do not simply ‘reflect’ phenomena, but can also have a symbolic and material function. Through close reading of infrastructures, policies, guidelines for data gathering, descriptions of standards for data, and data sharing, the boring details add up to a technical but no less normative view of what constitutes action, progress, and sustainability.

The rest of the chapter explores the site of negotiation and competition between ways of knowing, and shows how different dynamics are played out that connect the high-level pronouncements of policy-makers and their instantiation in data practices on the ground, with resulting shifts in the dynamics of accountability. In the following sections, I analyse five dominant dynamics in the maintenance, reinforcement expansion, and innovation of data infrastructures in relation to the SDGs.

### *Dynamic 1: Developing Global Data as Evidence*

If the practices and institutions that enact the modernist ideals of data for development of the UN are further developed, then global data becomes available as evidence. This means gathering data on the national level using traditional instruments such as surveys and demographic data that are administered by National Statistics Offices (NSOs). These NSOs are themselves embedded in a rich culture of national statistics production that includes participation in federations, negotiations around standardisation, and agreements on best data practices, documentation, and audits. This data flows to international organisations that are custodians of particular SDG targets, and to data repositories, a dynamic that largely follows the well-known path of quantification discussed earlier, with important variations to shape data in relation to indicators (Ruppert and Isin 2019; Beck and Mahony 2018; Turnhout and Boonman-Berson 2011). This dynamic was already visible in the late 1980s (Fortun 2004) and is now well-established and powerful in policy circles. It stresses rationality, consistency, and predictability in knowledge infrastructures, and its epistemic move is to create a neutral, controlled background against which the object of interest can become manifest. The calls for further development in this vein unsurprisingly focus on capacity-building and better funding of NSOs. An important step for this dynamic is, first, to implement the most traditional apparatus used to know populations and to establish basic administrative data systems. Such systems align institutions, data, and aid, thereby supporting those included while making those excluded even more vulnerable. Civil registration systems are therefore not only useful for producing statistics—they are also the institutions that extend identity and citizenship to people (Melamed n.d.). Those not included in these registries tend to come from the most vulnerable groups in the world's poorest countries—refugees, victims of human trafficking, and those living in remote regions or living a nomadic life. This vulnerability is compounded by preferences on the part of funders and donor agencies to work with countries that can demonstrate 'evidence-based need' and are able to measure impact (Cinnamon 2019). The result is that the established ability to produce evidence becomes a prerequisite for receiving aid. Data is itself a terrain where inequalities exist, with data rich and data poor countries. (Unidas 2014)

The first annual report on SDGs articulated high ambitions with regard to data:

The data requirements for the global indicators are almost as unprecedented as the SDGs themselves and constitute a tremendous challenge to all countries. Nevertheless, fulfilling these requirements through building national statistical capacity is an essential step in establishing where we are now, charting a way forward and bringing our collective vision closer to reality. (United Nations 2016a, p. 3)

Data for SDGs produced through NSOs conforms to standardised categories (such as age, ethnicity, income). Such categories make combination and comparison possible (Rottenburg and Merry 2015; Porter 1995), whether across nations or over time. Comparison across countries is essential to maintain the isomorphism between data generated and the governance structures of the UN—nation-level data, for an organisation whose members are nations. Exchange and sharing of data are deemed necessary for the full implementation and review of SDGs. This is manifest in the concerted efforts to develop and share national reporting platforms, the development of a standard called statistical data metadata exchange (SDMX) as a common language to support the data flows for SDGs, a federated Information System for the SDGs (Open SDG Data Hub), and the use of APIs. Clearly, datafication of evidence for the SDGs is well underway.

Besides the global scale of production and sharing of data, another important feature is the association of goals with particular indicators. Indicators already played a prominent role in the Millennium Development Goals, with forty-eight indicators used to monitor progress towards the eight goals. The 17 SDGs have been articulated, first in relation to 169 targets, then in the shape of 234 indicators. In the first five years of the SDGs, indicators have become increasingly prominent, as both signs and objects of a growing technocratic reporting apparatus on a global scale. There is a pyramid-like construction in which data on specific indicators flows from mandated official national statistics offices, to international ‘custodian agencies’ like the WHO or World Bank. These in turn report on the progress made towards meeting the targets associated with the SDGs.

But, as noted above, indicators can only function in a stabilised field. The UN’s institutional apparatus therefore produces not only definitions and guidelines for indicators, but also reports on the level of standardisation of indicators, the level of agreement on this standardisation, and the ability of national statistics offices to deliver on these indicators on the basis of various criteria. The road to knowing about the SDGs is therefore paved with indicators. The strength of the indicator discourse is such that even critiques of the bureaucratisation of development have tended to focus their attention on the appropriateness of indicators, arguing that the number of targets and indicators is out of proportion to the capacity for reporting on them (Roca and Letouzé 2016).

The dynamics around data as evidence for the SDGs is driven by the alignment of data production, data flows, and repositories, by reliance on quantification and standardisation, and further reinforcement of the nation state as key producer of data. The role of data in relation to the SDGs therefore varies from supporting policy to monitoring progress on them. It shapes what counts as progress towards diminishing inequalities and how comparisons are made across the world.

### *Dynamic 2: Disaggregation from Populations to Groups*

A second dynamic links data to policy by innovating the relationship of data to knowing and acting. Typical of UN documents, the Sustainable Development Goals Report 2018 states:

Without evidence of where we stand now we cannot confidently chart our path forward in realising the Sustainable Development Goals. To that end, this report also reflects on the challenges faced in the collection, processing, analysis and dissemination of reliable, timely, accessible and sufficiently disaggregated data, and calls for better evidence-based policymaking. Today's technology makes it possible to collate the data we need to keep the promise to leave no one behind. But, we need political leadership, resources and commitment to use the tools now available. (United Nations 2018, p. 3)

Note that not only the SDGs are challenging, but *data* in the service of policy also poses challenges: data needs to be reliable, timely, accessible, and sufficiently disaggregated. The first three attributes are classic issues in data gathering for UN purposes. Disaggregation is a somewhat more novel requirement, especially when posited as essential to the successful implementation of the SDGs. In tandem with the phrase 'evidence-based policy', the commitment to 'leave no one behind' is a staple of reports and communications about the SDGs, and a driver for data disaggregation. The UN initiatives link this goal to the existence of data and indicators that address specific groups within a population (United Nations 2016b). This link politicises data and indicators as means to reach an emancipatory end. If no one is to be left behind, then the data on progress towards the SDGs must be created and communicated in a way that avoids making some invisible (United Nations 2018, 2019).

While nation-level reporting has been entrenched in UN practices, variation within a country is repeatedly and increasingly stressed across the Sustainable Development Goals Reports issued between 2016 and 2019. An important element is the call to consider 'target populations' or 'groups', which are not well represented by population-level indicators (United Nations 2016a). This is a non-trivial aspiration that strongly contrasts with the foundational approach of NSOs, which focus on national populations. Given this departure from established definitions and instruments, the sparsity of data is not surprising. Current data gathering stands in the way, and groups such as

Children living outside of family care, persons with disabilities and older persons ... have largely fallen off the statistical 'map'. While innovative approaches for bringing these hidden populations into focus have begun to emerge, more resources and capacity-building efforts are needed to ensure that vulnerable groups receive their long-overdue place in the development agenda. (United Nations 2017)

Without disaggregation, these groups remain invisible and are therefore not served by development programmes. This line of reasoning links the availability of data and the possibility of action.

Disaggregation challenges ‘populations’ as the unit of data gathering, and warrants the use of new data sources and technologies, including partners beyond NSOs (civil society, the private sector, and academia) (United Nations 2019). Parallel organisations are emerging at the global level, such as DataPop and Global Pulse, and they are charged with the exploration of these dynamics for the UN. In addition, the newly created United Nations World Data Forum aims to serve as a platform to bring data producers and users together and to work on capacity development, disaggregation, and ‘synergies across data ecosystems’. There are also changes underway in the work of NSOs, and of civil registration and vital statistics organisations, to make disaggregation possible, through efforts to insert additional features of groups in population-based systems.

We know that the creation and processing of population data is a major achievement (Ruppert 2012). The alignment of civil registration systems with national statistics offices and with the UN and its agencies requires mutual adjustments that can span decades before data flow is considered robust. Careful attention to such alignments reveals how new ones might be emerging, reshaping the existing relations between governance and evidence. In our datafied world, as Hoeyer et al. (2019) have noted, visibility and counting merge. The kind of disaggregation being implemented will shape who those ‘left behind’ might be, as well as who will be able to speak on their behalf. What is produced are categories that create and perpetuate social differences, with implications for access to services, representation, education, and healthcare. As Cinnamon has noted, these processes tend to be ‘opaque and under-regulated’, bringing risks for ‘the propagation of errors if these data are aggregated for use as proxy national development statistics (Taylor & Broeders, 2015)’ (Cinnamon 2019, p. 12). The resulting assemblage creates particular vulnerabilities (Arora 2016), but the actors responsible are identifiable and accountable.

What we are seeing in the wake of the SDGs’ efforts is a different assemblage of technologies, with a murkier chain of responsibility and accountability. In a context of population-level statistics, national governments are the relevant actors, whereas with global data, international organisations are the correspondent actors. But who is the relevant actor when we speak of ‘no one’ being left behind? Who is the actor for whom disaggregated data would be usable, and how does this kind of data shape the possibility for action? Too little attention has gone into asking whether the mobilisation of disaggregated data might also have the unintended effect of disempowering or stigmatising groups, making them even more vulnerable. The related issues of the empowerment of private corporations as gatekeepers of social knowledge and the disempowerment of the traditional actors such as NSOs have also been largely ignored.

### *Dynamic 3: Localisation of Data*

A third set of calls for innovation in SDG data have to do with the localisation of data. In the context of data for SDGs, there is a mixed picture with regard to the foregrounding of geographical information. On the one hand, the UN paradigm of nation-level reporting remains dominant, with all UN platforms for the SDGs maintaining the nation state as the reporting unit for its members; on the other, reports and policy documents continue to call for increased localisation of the SDGs and their data. In line with the policy aims discussed in the previous section, the reasoning is that as long as variation within the space of a country is not known, the ability to leave no one behind remains limited since national averages hide intra-national disparities. The connection between having data and the possibility of acting is once again emphasised. In this case, however, it is articulated on the basis of the requirement for more granularity in terms of geographical location:

National statistics can be acted upon when the data is broken down to focus on specific categories of interest or locality. While data is usually disaggregated across people-centric variables—such as gender, age, income, ...—the global indicator framework has specified that it is equally important to be able to analyse data across different geographic locations. (Working Group on Geospatial Information 2018)

To address this ‘gap’ between knowing and acting, the working group recommends combining geo-spatial information with SDG data.

The increasing prominence of geo-location is related to the increasing availability of positioning information (satellite data). This data is combined with signals from trackers (for animals, goods (IoT), etc.), or with data from mobile phones or internet-connected devices, to produce an approximation of location. The growing role of cities and regions as actors<sup>1</sup> in SDGs and in the areas of housing and transport (Hajer et al. 2015) also fuels demand for data that is more granular than at national level; actors seek data that corresponds to their sphere of influence.

Efforts to localise data reveal the obduracy of established data pipelines (de Rijcke and Beaulieu 2014). It is not a case of ‘add geographical information and stir’. Official statistics and Earth observation data have developed separately, using different techniques in different institutions, and the multiple challenges of combining these types of data are not likely to be overcome in the short term (UN Environment 2019). Concretely, toolkits and platforms to localise SDG data are emerging, but they tend to come from organisations working in parallel to NSOs. At this institutional level, countries most in need of localised data may be those least able to generate it (Patole 2018). Just like the requirement for disaggregation, localisation goes beyond the current capacities of NSOs and developing this capacity requires additional investments.

Obtaining geo-located data raises major issues of access, ownership, and openness. Geo-located data often relies either on satellite data, which may be public or private, or on proxies such as triangulation of mobile phone signal or IP addresses of internet-connected devices. The network operators that collect and control this latter data are overwhelmingly private companies. The language of Article 76, of the United Nations document on the Sustainable Agenda indicates great optimism that this can be addressed through ‘appropriate public-private cooperation to exploit the contribution to be made by a wide range of data, including Earth observation and geospatial information, while ensuring ownership in supporting and tracking progress’ (United Nations 2016b). But given the extent to which public values clash with those of corporate platforms (Dijck et al. 2018; Zuboff 2019), such statements—five years later at the time of writing—already seem overconfident, bordering on naïve. Besides issues of entwined interests and ownership, the disaggregation and geo-location of data create new vulnerabilities. If being invisible means someone can be left behind, it also carries with it the possibility of being sought out (Letouzé and Vinck 2015). If disaggregation increases the risks of identifiability and stigmatisation, then localisation increases the risks of being physically found and targeted for intervention.

#### *Dynamic 4: Diversification of Data Sources*

The motifs of a ‘data revolution’ and of ‘harnessing the power of Big Data’ to enrich the range of data used have been part of the SDG discourse since about 2014. The UN World Data Forum meetings (2017 in Capetown, 2018 in Dubai, and Bern [online] 2020) further strengthen the calls for the use of ‘Big Data’ to leave no one behind (United Nations 2017). In the guide *Data Innovation for Development*, the promise is that

alternative sources of data can and should play a role in pursuing development outcomes, and, as such, hold great promise for fulfilling the Sustainable Development Goals—both from the perspective of pursuing the outcomes as well as enabling (close to) real-time monitoring and evaluation. (Global Pulse 2016, p. 4)

The dominant discourse is that Big Data methodologies developed in business will replace current ones (UN Global Pulse 2016). For example, rather than relying on traditional household surveys, the use of night-time satellite imagery is proposed to measure consumption of energy and as a proxy indicator of poverty and growth (Jean et al. 2016; Henderson et al. 2012).

Typical of such Big Data projects is the exploration in the form of pilot projects of what these sources can mean as a complement to existing data; they are usually used as Tier III indicators for SDGs, for which no agreed-upon methods or standards exist. This makes them less comparable and more closely tied to their context of production, often outside NSOs. Thus, they may be

‘[c]ountry-specific indicators developed either by government through the national statistical system or by non-official data producers such as civil society, research institutions or the private sector’ (United Nations Development Programme 2017). Projects to explore new indicators can include the scraping of content on social media platforms, such as using Twitter data to measure public sentiment on corruption (Tunisia, DIFD 2016); or the use of comments on official governmental Facebook pages in Botswana to measure satisfaction with government services (Celli and Stock n.d.); or combining public health data with data from private mobile phone network operators to track population movements in India to monitor the spread of TB (GSMA n.d.).

But even though the data may be big, it is also limited, although these limitations can be difficult to document (van der Vlist 2016; Kitchin 2016). The number of tweets or posts that can be retrieved, the access policies with regard to retrieval by users versus bots, and the algorithmic ordering and prominence of contents are all important conditions that can only partially be known by researchers. Even to corporate insiders, these elements often remain undocumented and undisclosed, in line with the proprietary nature of this data and with processes of commodification on these platforms (Dijck et al. 2018; Beaulieu and Leonelli 2021). Many of the conditions that shape data are, furthermore, subject to change, based on corporate strategy—to say nothing of ever-changing demographics of users and levels of access to these platforms over time. All this means that, even if the relevance and validity of this data can be established, the lack of baselines and the ‘baseless data’ of Big Data (Knox 2018) mean that comparing data over time or in different settings to monitor progress on the SDGs will be far from straightforward. Can we imagine development indicators based on a logic of ‘now trending’ or ‘virality’, rather than on the current constructs of external validity inspired by social science?

There are also differences between the statistical relationships of validity and causality valued by NSOs and development agencies and those fostered in corporate settings where predictive models dominate (Schutt and O’Neil 2013; UN Global Pulse 2016). In addition, corporate settings favour an iterative approach to models and welcome the constant growth of data. In contrast, most development work uses a framework shaped by more traditional social science research in which higher standards of inference are demanded and where the ‘experimental set up’ is the gold standard.

Calls for the use of more types of data may seem like a step towards creating a richer picture of development. But data comes with epistemological, political, and ethical strings attached. These new practices seem to be developing with a minimum of scrutiny of what it means for corporations to act as gatekeepers (Cinnamon 2019). Enthusiastically welcoming ‘data philanthropy’ (Kirkpatrick and Vacarelu 2019) means that maintaining warm relationships with corporations becomes essential, if access to data is dependent on corporate goodwill. Yet philanthropy cannot always be assumed.<sup>2</sup> This risk too tends to be backgrounded by the UN in favour of pleas for the development of international shared standards for data sharing and privacy-protection, (Kirkpatrick and

Vacarelu 2019). Other issues are sometimes noted, like the degree of penetration of technology needed for crowd-sourcing to be effective (Kirkpatrick and Vacarelu 2019). Such faith in the promises of Big Data, assumptions about the desirability of philanthropy, and a focus on individualised risks like personal privacy breaches leave systemic issues around diversification of data unaddressed.

### *Dynamic 5: Meaningful Accountability*

In an effort to show progress across countries and across the different goals, the SDG Index orders countries according to their performance. This performance is based on indicators fed by complex data flows, and countries are ranked according to their performance across all seventeen goals (see Table 2.1 here: <https://s3.amazonaws.com/sustainabledevelopment.report/2021/2021-sustainable-development-report.pdf>). All this material forms the basis of the annual SDG Reports and of the data releases that can be explored via the dashboards, according to SDGs, region, country, or over time (Sachs et al. 2020).

The SDG Index is the apex of the data aggregation pyramid, and the ultimate distillation of quantified data produced by state bureaucracy according to global standards. It summarises a country's performance across the SDGs with single figures. The meaningfulness of such highly abstracted data has been critiqued, and a recent audit warns that differences between countries should not be given too much weight (Papadimitriou et al. 2019).

These critiques of metrics and indicators arise in tandem with calls for more meaningful assessments closer to the actual activities pursued (also heard in other fields, see de Rijcke et al. 2016, 2019). A more distributed, grounded approach to data is seen as an opportunity not only for more granular, more timely data, but also for meaningful accountability. What is interesting to note is that there is also an accompanying epistemological shift in relation to data and knowing: if the gold standard of the experimental form dominated as the hard-to-reach ideal for knowing about development initiatives, a different approach is emerging (Jensen and Winthereik 2012). In this discourse, a phrase that often recurs is that monitoring of development should aim 'to improve rather than (only) prove'. The specificity and rigidity of indicator data are at times argued to be in tension with learning and meaningful progress.

In this spirit, many organisations seek alternatives to what they consider to be overly narrow indicators. The Sustainable Development Goals Tool is a web-based tool developed by the Cambridge Conservation Initiative (CCI) (2018a). It provides practitioners with a simple interface to review systematically how their projects could be linked to the SDGs at the level of *targets*. Recall that the 17 goals are articulated through 169 targets, which are in turn linked to 234 agreed-upon indicators. CCI's tool allows conservation professionals to explore how their biodiversity projects can contribute to SDG

targets, beyond the goals specifically formulated on biodiversity (Life Below Water [14]; Life on Land [15]). A wizard takes the user through a series of questions about what the project does, whom it involves, the kinds of activities pursued, and its expected impact, then suggests links between these answers and SDG targets. The user can add notes, modulate the level of importance (major/minor) and keep track of the relevant targets digitally. The outcome of the wizard is a list of targets to which a project contributes that can be exported and annotated, or used for interactive presentations and as an infographic.

The makers of the SDG Tool motivate their choice of the target level as a more meaningful anchoring point, arguing that a focus on indicators may miss many important project contributions. Indicators are critiqued as being in danger of becoming their own goal, pursued for their own sake—a well-known feedback loop in metrification (Beer 2015; Merry 2011; Rottenburg and Merry 2015). Targets are also preferred over goals, since goals are said to represent ‘siloes’ (hunger, poverty) whereas the target level does more justice to the ‘integrated agenda [of the SDGs], incorporating the interlinkages between the social, economic, and environmental dimensions of sustainable development’ (Cambridge Conservation Initiative 2018b). A similar point is also made by Bewley-Taylor, who argues that SDG targets help create awareness of the intersection of issues, such as drug control with food security or health, resulting in better action (2017).

If we contrast the SDG Tool of the conservationists with the scope of the SDG Index and global data assemblages of the UN agencies as predicated on their relationships to the NSOs, it seems a case of David versus Goliath. The UN’s data on SDGs relies on a huge apparatus and makes use of highly standardised tools, methods, and institutions so that mediated data practices produce ‘techno-metricized accountabilities’ (Hoeyer et al. 2019). In contrast, the SDG Tool’s gentle exploration—in dialogue with an embodied expert committed to a project—shows that digital technology *can* be modulated to yield a different kind of accountability. It remains a massive challenge to make such alternatives viable, as earlier efforts to implement information and monitoring systems that have a more situated logic have shown (Fortun 2004). The example of the SDG Tool illustrates that the sensitivity to variations in the uses and meanings of technology fostered by anthropology of technology is an important asset when approaching local reactions to global paradigms like the SDG Index.

## CONCLUDING DISCUSSION

The five dynamics signal a number of shifts in how the SDGs are constituted as global objects. They are challenging for the UN, its agencies and NSOs (UNECE Steering Group 2019) in terms of ‘sovereignty over data regimes’ (Bigo et al. 2019, p. 6). They affect for whom SDGs are relevant, as well as who is enabled by and responsible for acting on them. We may not only be

seeing a realignment of existing ‘lines of accountability’ (Guston 1999), but also a shift from the kind of accountability that dominated by the end of the twentieth century, based on system-level relations and access to data on public service delivery (Hoeyer et al. 2019). The use of Big Data from corporate actors does not align with the categories and techniques of modernist accountability that are dominant in the global and national statistical institutions.<sup>3</sup> To take but one example, we need to consider what reliance on data philanthropy means for the impetus to ‘leave no one behind’. The shift in categories of citizens to consumer is a weighty one; does it also redirect the development agenda from an aspiration to extending universal rights to striving for total market penetration? These big questions need to be raised by anthropology of technology because the knowledge infrastructures we maintain and assemble contribute to their answers. The opacity of corporate data production, the accountabilities of corporations to their shareholders and customers rather than to citizens and governments, and the deep epistemic differences in statistical operations cannot be underestimated. What is at stake should not be reduced to technical questions of measurement, criteria, and accessibility (Merry 2011) or to cautionary notes on complying with privacy and security (Kirkpatrick and Vacarelu 2019).

The dynamics analysed are also generative of new possibilities, especially with regard to the temporality and spatiality of global objects. With regard to the temporal dimension, the stability of organisations and networks contributes to the creation of long-term data that has enabled us to track environmental change (Edwards 2019). ‘Timeliness’ is a feature of Big Data that has been enthusiastically embraced. The (near) real-time or short-term delivery of data is seen as an opportunity to develop ‘early warning’ practices (UN Global Pulse 2016). This temporal characteristic matters because it can shift knowledge infrastructures from a focus on monitoring progress accomplished, towards predictive policy-making. This may be an effective way to create a sense of urgency, but it can also limit the extent to which formulations of sustainable development, such as those of the Brundtland Report involving future generations, remain relevant because of clashing temporalities.

The scale of global objects is also called into question by these dynamics. While national institutions coordinated into global networks have dominated in recent decades (Edwards 2013; Beck et al. 2016), their work may cut us off from how we know climate or biodiversity in a more local sense. While the erasure of geography is part of what makes knowledge global, it also removes the possibilities for apprehending difference, heterogeneity, and complexity in the interactions between societies and natures (Turnhout et al. 2014; Turnhout et al. 2016). It makes invisible the relative responsibility for the creation of global problems and their differentiated impact in various parts of the world, an issue that has been especially closely analysed in the case of climate change and emissions (Beck et al. 2016; Latour et al. 2018). Indicators such as average global temperature obscure other potential signs of climate change that might

mobilise actors (Turnhout et al. 2016). Calls to do data differently could even be seen as a kind of de-globalisation or re-localisation of data. Current attempts to disaggregate, localise, and diversify sources of knowledge and to articulate them in relation to the SDG targets might be a path towards reidentifying with issues meaningfully.

If the data flows of NSOs based on household surveys and socio-demographic, state-based data tend towards the global, many of the Big Data pilot projects so far tend towards the local and the specific. On a hopeful note, in several of the pilot projects, the context of data creation has been detailed, precisely because of the perceived lack of standards and mechanisms of stabilisation for this kind of data. There has, therefore, been more attention paid to the elements that create the ‘baselessness’ of Big Data (Knox 2018), its iterative nature, and the ever-changing condition of production. This may open up a gap in the business as usual of abstracting data and serve as a breeding ground for a more contextual approaches to data. This, in turn, might help us depart from linear notions of progress (Tsing 2015) and create different accounts of development. The scenario to avoid is that we end up with the worst of both worlds: stately, remote, aggregated data from NSOs and unaccountable and unverifiable data snapshots from Big Data obtained on the fragile basis of corporate goodwill. While some analysts see a gradual mixing rather than an abrupt shift to a new data regime (Ruppert and Isin 2019), this easing into a new configuration demands careful scrutiny. The sensibilities and tools of anthropology of technology equip us to keep asking not only whether privacy regulations are being respected but also, more fundamentally, how these dynamics around new sources of data change the science-policy relationship, and which new kinds of knowledge are being acted on, by whom, and on whose behalf.

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## NOTES

1. See networks such as United Cities and Local Governments (UCLG), Global Covenant of Mayors for Climate & Energy) and [USA-Sustainable Cities Initiative \(USA-SCI\)](#).
2. A notable case, where telephone data in Sierra Leone, Liberia, and Guinea was *not* used to help face the Ebola epidemic in West Africa (McDonald 2016).
3. Edwards (2019) shows what happens to climate knowledge infrastructures when chains of evidence are destabilised through funding cuts, privatisation, fragilising of input, emerging types of review/audit that challenge established modes of expertise.

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