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Statistical capacity development and the production of epistemic infrastructures

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Abstract

Designating statistical capacity development as a target for measurement in the Sustainable Development Goals (SDGs) created a dilemma for statistical decision-makers in the United Nations system, as some saw the inclusion of statistical capacity in SDG17 as a "conflict of interest," making their work both a goal of the SDGs and a means to achieve them. In 2022, there are five indicators for measuring both the statistical capacity of individual countries and the support provided to strengthen it, including one indicator for measuring a country's ability to monitor the SDGs themselves. In this article, I argue that the epistemic infrastructuring of statistical capacity into the SDG framework is a privileged case. By parsing the interconnections between the data, actors, networks, and processes that constitute statistical capacity on national and global levels, we can understand how central these materialities and processes are in constituting the larger policy agenda of the SDGs as well as debates over the problems that statistical capacity is meant to solve. Like all indicators in the SDG framework, statistical capacity indicators are performative – defined and delineated by the global statistics community that also helps define and delineate the SDG framework's development problems. Unlike other indicators, however, statistical capacity indicators have the added weight of also producing the conditions of possibility for the "SDG framework itself." In this way, debates over what constitutes statistical capacity and its strengthening are also debates about ownership of policy agendas and where tensions between the local and global erupt.

Keywords: SDGs, statistical capacity, epistemic infrastructures, data

At the first statistical consultation on the proposed indicator framework for the Sustainable Development Goals (SDGs) in June 2015, a representative of the Samoa Bureau of Statistics and the Fiji Bureau of Statistics made clear that making statistical capacity development a goal to be measured within the framework itself was a monumental shift to be celebrated:

> We believe it is HIGH TIME for all National Statisticians, to see statistical development appear as a development objective in its own right. I hope, madam Chair, as a fellow national statistician, you share in our delight. (UNDESA, 2015b, p. 4, his emphasis)

In a recent report of the United Nations (UN) Secretary-General on the issue to the UN Statistical Commission, the authors reiterate the oft-cited assertion that the "adoption of the 2030 Agenda for Sustainable Development brought increased attention to the need to strengthen the statistical capacity of developing countries to measure, monitor and report on the Sustainable Development Goals, including the associated targets and indicators" (UN Economic and Social Council, 2020, p. 2). The substantial knowledge production, methodological deliberation, and network creation required for the global monitoring of the 231 unique indicators for the SDGs' 17 goals on the part of UN custodian agencies—alongside the monitoring of "nationalized" SDG indicators on the part of national statistical systems (NSSs) (e.g., Cambodia's Ministry of Planning, 2019)—put official statistical systems and development data in the global spotlight like never before in the existence of the UN Statistical Commission (UNSC), a governing body that has entangled international development with statistics since its creation in 1947 (Ward, 2004). In both explicit and implicit ways, the SDGs built on and departed significantly in substance and form from the Millennium Development Goals (MDGs). The MDGs and their 60 indicators were widely critiqued as being donor-driven, inappropriately focused on "meeting basic needs" rather than promoting a transformative agenda, and applied exclusively to countries in the Global South (Fukuda-Parr & McNeill, 2019, p. 8; Amin, 2006; Fehling et al., 2013). The SDGs, however, were explicitly formulated to "allow the participation of stakeholders" other than the UN Secretary-General and agencies, where the MDGs had not, in the refinement of the global development agenda (Fukuda-Parr & McNeill, 2019, p. 9). In establishing that statistical and data collection systems themselves require the same kind of attention as other policy arenas—that statistical capacity should be seen as "a development objective in its own right" as described above—the global statistical community has made explicit the infrastructure required to promote global sustainable development, while also putting into sharp relief the ways that policies are co-constructed with quantified knowledge.

Social scientists of quantification have written extensively about how enumeration has radically changed the nature of governance by state and non-state actors on both local and global scales (Adams, 2016; Grek, 2009; Rose, 1991). This includes showing how indicators have become a "globally circulating knowledge technology that can be used to quantify, compare and rank virtually any complex field of human affairs" (Rottenburg & Merry, 2015, p. 5). Because of the power of numbers—power that is situated in quantification's assertion that it can "produce knowledge independent of the particular people who make it" (Porter, 1995, p. ix)—indicators are often presented as "taken-for-granted facts," even while they are debated and contested. Despite their appreciation for the advocacy attention that the issue is now receiving, many statistical decision-makers also find the inclusion of indicators to measure statistical capacity development (SCD) into the SDG framework a contentious issue. As one member of the global statistical community put it: "if we put ourselves into the agenda, then we have a *conflict of interest*, because [then] we have a dual role as […] a beneficiary and a goal, and a means to achieve the SDGs in general" (UN Statistician 1,[1] 2020a, my emphasis). As beneficiaries, as goals, and as means to promote the success of the SDG framework as a whole, statistical capacity is understood by members of this community—which is linked by the UNSC and its various working groups—as the foundation, or infrastructure, that allows for the monitoring of the entire 2030 Agenda. As will be elaborated below, the conflict of interest articulated by this member of the community—an economic mathematician who has worked as a statistician in the UN space for more than 30 years—includes the fact that this global statistical community is interested and invested in demonstrating the improved statistical capacity of countries, while those in the community are simultaneously required to be their own assessors on that score. By incorporating statistical capacity development into the framework that requires that capacity in order to produce numbers on the SDGs in general, this "dual role" requires that this community turns these capacities back on itself in a recursive move.

This conflict of interest also extends to the SDGs' interests—and the interests of those invested in the success of the SDGs as a global agenda—which are inscribed into the concept of statistical capacity. Indicators are performative; because they inscribe particular theories and assumptions about the world in their production, indicators, as Callon (2006, p. 10) argued with the case of economic theories, are "actively engaged in the construction of the reality" that they describe. Quantification is "hungry for categories" (Hacking, 1982, p. 280), and in this way, counting and sorting create boxes for people and

[1] In this article, for the sake of anonymity and clarity, I have grouped interviewees into the categories of "National Statistician," "Civil Society," and "UN Statistician," and the latter category including those working at United Nations agencies as well as Bretton Woods organizations and including those representing the statistical interests of their institutions in the UN space, even if not formally trained as such.

phenomena to fit into (Hacking, 1986; Star & Bowker, 2002), making the global statistical community's counting work central to the production of policy problems. In this way, the indicators for statistical capacity inscribe the centrality of the SDGs into the definition of a country's statistical capacity, as one of the five indicators used to measure SCD includes an indicator on a country's ability to produce data for each SDG.[2] Thus, statistical capacity has a recursive quality in the SDG framework: As both a goal and a tool for achieving the SDGs, it is defined by the "success" of the SDGs as a governing and policy paradigm. Part of the means of determining whether an NSS is "at capacity" is if it has taken on board all of the SDGs and is producing data to monitor them. However, this explicit tie of statistical capacity to the SDG framework is by no means a consensus-held position, and debates about how to define and measure statistical capacity lay bare the very tensions that are at the heart of the global public policy of the 2030 Agenda.

In this article, I argue that the infrastructuring of statistical capacity as a development problem itself into the SDG framework is a privileged case of the epistemic infrastructure of the framework as a whole. As we have argued elsewhere (Tichenor et al., 2022, p. 431, this issue), the concept of epistemic infrastructures provides us a tool by which we can analyze the "new *materialities*, new *interdependencies* and new *governing ideas*" that constitute the SDGs. Building on the science and technology studies literature on infrastructures (Bueger, 2015; Star & Ruhleder, 1996) and policy studies scholarship on the production of paradigms (Coleman et al., 1996; Hall, 1993), our concept of epistemic infrastructures highlights the iterative nature of the SDGs' governance by numbers and the entanglements of human and nonhuman agents, networks, and processes in producing its policy paradigms. By parsing the interconnections between the data, actors, networks, and processes that constitute statistical capacity in this context—as an iterative, incomplete infrastructure—we can understand how central these materialities and processes are for constituting what is included in the larger policy agenda of the SDGs. Not limited to Jensen and Winthereik's (2013) "aid information infrastructure," the epistemic infrastructure of the SDGs—and attempts to concretize it through statistical capacity development—reaches toward a datafied representation of the universalizing concept of sustainable development. Like all indicators in the SDG framework, those measuring statistical capacity are performative – defined and delineated by the global statistical community that also defines and delineates the development problems to be measured by those statistical systems. In this way, control over the measurement of statistical capacity is particularly important, as it will determine what will be possible on both the national and global levels for the coming decade and beyond.

In the next section, I will outline how the concept of epistemic infrastructure helps us understand "capacity," showing how the analysis of statistical capacity with an infrastructural lens reveals the conditions of possibility built into the SDG framework. I will then briefly lay out the methods and data sources used for this article. This will be followed by a careful analysis of statistical systems as epistemic infrastructures, which exist on national, regional, and global scales. Debates over how to measure this infrastructure highlight a fundamental tension in the SDG framework as a whole: the relationship between global and national priorities. There are those who promote statistical capacity as a means of supporting national autonomy, as a way to "say no to" or "fend off the donor" and to address the problem of "misaligned" priorities that produce multiplied and distorted streams of development data. This view is contrasted by one of attempting to measure what is measurable—including defining capacity by the mere existence of data produced by the system. Fundamentally, I argue that by looking at the global statistical community and its materialities, networks and processes, and governing paradigms—collectively as an epistemic infrastructure—we can see how measuring has been the site of tension between promoting a locally-led development agenda and the infrastructural intransigence[3] of donor-led monitoring and accountability frameworks. These tensions are situated in long histories of international development, to which I turn in the following section.

[2] The methodology and data sources for Indicator 17.18.1 ("Statistical capacity indicator for Sustainable Development Goal monitoring"), introduced with the UN's Inter-agency and Expert Group on SDG Indicators' (IAEG-SDGs) 2020 comprehensive review, are still under consideration by the IAEG-SDGs as of July 2022.

[3] I would like to thank one of my anonymous peer reviewers for this great turn of phrase.

Epistemic infrastructuring: constructing and maintaining the systems for understanding the world

As discussed above, defining statistical capacity in the context of the SDGs has an impact on the ways that problems are formulated in sustainable development on the national and global levels, as social scientists of indicators have argued in the context of other policy arenas. Represented as "taken-for-granted" facts, indicators are in fact "novel epistemic objects of regulation, domination, experimentation and critique" (Rottenburg & Merry, 2015, p. 5). Framing the SDGs and their associated machinery for monitoring and measurement as an epistemic infrastructure provides a lens for analyzing the feedback loops between quantified data, knowledge practices, and epistemic communities and the resulting policy problems and their solutions. The official statistical system that monitors the SDGs at the national and global levels and the larger community of development data production within which and next to which it sits can be understood as a microcosm of this epistemic infrastructure. The official statistical system includes both national governmental institutions—like the United Kingdom's Office for National Statistics or the National Statistical Office of Mongolia—that gather, process, and publish routine social, economic, and environmental statistics about a nation's population, economy, and society. It also includes international institutions—like the statistical offices of UN agencies and Bretton Woods organizations—that both compile and harmonize statistics from national institutions and help gather, process, and publish the statistics on a national level themselves. Official statistical offices began gathering and compiling information about births, deaths, levels of health, and property transfers within national borders in the late 18th and early 19th centuries. Foucault (1978, p. 139), and others have argued that this "biopolitics of the population" through the production of statistics about a new thing called a "population" was central to the creation of contemporary Western concepts of governance. Early forms of international official statistical systems included the statistical harmonization efforts of the Pan-American Sanitary Bureau (what would become the Pan-American Health Organization) and the League of Nations in the early 20th century, but it was truly established with the creation of the UNSC in 1947, as further described below. Since the 1990s, this "official statistical system" has been increasingly complemented by nongovernmental entities producing similar social, economic, and environmental data about populations not necessarily bounded by national borders. This "development data community" has sprung up partly due to increased pressure from donor countries and funding agencies onto countries receiving aid—many with limited statistical capacity—to produce accountability data for development aid entities (Gimbel et al., 2018). Thinking of this network of statistics and data institutions as a microcosm of the SDGs' larger epistemic infrastructure highlights the fact that it is a relational concept, becoming "infrastructure in relation to organized practices" (Star & Ruhleder, 1996, p. 113).

A few of Star and Ruhleder's (and Bowker's) salient features of infrastructures are crucial for our discussion of statistical capacity here. First, it is *embedded*, that is "'sunk' into, inside of, other structures, social arrangements and technologies" (Star & Ruhleder, 1996, p. 113). As Star and Bowker (2002, p. 151) state elsewhere, it "never stands apart from the people who design, maintain and use it." Second, it is learned as "part of membership in a community of practice" – members of these communities acquire a "naturalized familiarity" only upon use of the infrastructure (Star & Ruhleder, 1996, p. 113). Third, it is "built upon an installed base"—it inevitably "wrestles with the 'inertia of the installed base' and inherits strengths and limitations from that base." Fourth, it requires standardization and classification and an attempt at resolving the tension between the global and the local. Finally, an infrastructure "is not absolute, but relative to working conditions" (Star & Bowker, 2002, p. 151). From the anthropology of infrastructure, we understand that it is incomplete and can only be understood temporally and in the context of change over time (Anand et al., 2018). Infrastructures "are important not just for what they do in the here and now, but for what they signify about the future" (Anand et al., 2018, p. 19). Appel (2018, p. 44) argues that infrastructural projects inherently juxtapose a mythical developmental time—linear, progressive, and teleological—with infrastructural time—"repetition and cyclicality; serial frontiers; abandonment, decommission, and ruins." Infrastructure often carries with it a hopefulness for the future, and yet "infrastructures are always already on the way to becoming ruins" (Gupta, 2018, p. 62), requiring constant maintenance to attempt to delay this inevitable decay and obsolesce. Here, we can see how easily conceptualizations of infrastructure and capacity development can become entangled.

Following Douglas-Jones and Shaffner, I agree that capacity development[4], like the audit (Shore & Wright, 2015), has served as "a mode of thinking and analysis that makes particular political actions seem reasonable and justified" and requires careful analysis as a concept that makes possible certain policy decisions (Merry, 2015, qtd. in Douglas-Jones & Shaffner, 2017, p. 2). Douglas-Jones and Shaffner highlight the "tension between hope and insufficiency" that is at the heart of the concept of capacity development, which they argue first appeared in development discourse in the late 1980s and early 1990s (Eade, 2010; Fuduka-Parr et al., 2002). They locate the emergence of the term with the push for national ownership in international development that emerged from a recognized misalignment between donor and country priorities in the 1990s, which led to the 2005 Paris Declaration on Aid Effectiveness. As will be seen in the empirical findings section, this push for "harmonizing" development was also one of the major engines for the growing demand for data and statistics for monitoring development results—the other engine was, of course, the push from the opposite angle for accountability data from donor agencies (Gimbel et al., 2018). However, "capacity development" can be stretched to mean anything, which makes the questions of "which capacities" and "for whom" central to understanding the work that capacity development does (Douglas-Jones & Shaffner, 2017, p. 3). Defined by change over time, capacity development requires a constant attention to what is "insufficient" and implementation of efforts to patch such insufficiencies. In the context of the epistemic infrastructure of the SDGs, these insufficiencies are often framed by a country's ability to monitor the goals themselves and capacity development activities defined on the part of UN agencies as solutions to these missing data: training representatives from national statistical offices on specific methodologies and analyses for producing, synthesizing, and using these data. As will be discussed further below, actioning capacity development in this way has led to a narrowing down of what constitutes statistical capacity as well as, paradoxically, an opening up of *whose* capacity becomes the object of intervention for sustainable development. Statistical capacity as a development objective makes visible the invisible by making space for a debate on the nature of the epistemic infrastructure itself, as statisticians deliberate over what trainings, methodologies, educational infrastructure, and forms of ownership should be labeled as foundational to the infrastructure as a whole.

Methods

This article is based on document analysis, participation in virtual and in-person statistical meetings, and 20 semi-structured interviews with key members of what I am calling the "global statistical community", a label which some members of this community use themselves: statisticians, data scientists, demographers, and other development researchers currently or previously working in statistical offices of or data production capacities in UN agencies, national statistics offices (NSOs), and affiliated nongovernmental organizations. I have kept these individuals and their affiliations anonymous here, but these institutions include the UN Statistical Division (UNSD), the Partnership in Statistics for Development in the 21st Century (PARIS21), the World Bank, the UN International Children's Emergency Fund's (UNICEF), the World Health Organization (WHO), the International Labour Organization (ILO), the UN Population Fund (UNFPA), the UN Food and Agriculture Organization, the UN Office on Drugs and Crime, the UN Conference on Trade and Development, and various national statistical offices and affiliated nongovernmental organizations. Documents analyzed include official reports and action plans, working papers, and official written commentaries on SCD indicators contributed by these agencies and other members of this community. Meetings attended included the 51st UNSC in 2020 (in-person) and the 2020 World Data Forum, the 11th Inter-Agency and Expert Group on SDG Indicators (IAEG-SDGs) meeting, and various webinars (virtual). In interviews, I focused on questions about collaboration between different actors and organizations, contestation, values, narratives, and definitions of key concepts in the context of statistical capacity development. These interviews were then transcribed and imported into NVivo along with these documents and my field notes from these meetings, which were iteratively coded for themes and sub-themes.

[4] Douglas-Jones and Shaffner use the terminology of "capacity building" rather than "capacity development," the latter of which I will use throughout the article. This reflects a recent change that the Partnership in Statistics for Development in the 21st Century (PARIS21) and other organizations have promoted in the global statistical community, arguing that the concept of building "signals something […] and we felt that there is a need to sink away from 'building' and supply-driven approaches to more demand-driven approaches" (UN Statistician 7, 2020). For this member of the global statistical community, "capacity building" signalled a donor-centric vision of statistical capacity, one led by "supply" (i.e., driven by the funding provided by various international donors to produce data and statistics) rather than one led by the "demand" of countries for data to inform their national policy.

Empirical findings

Statistical systems as epistemic infrastructures

What constitutes statistical capacity and its development? As might be expected, there is no consensus, and the categories of both statistical capacity and the resources to strengthen it can be quite vast, depending on the organizational position. As the international organization that devotes the most effort to conceptualizing statistical capacity and its development, PARIS21 defines statistical capacity as "the ability of a country's national statistical system, its organizations and individuals to collect, produce, analyze and disseminate high-quality and reliable statistics and data to meet users' needs" (PARIS21, 2018a, p. 9). This definition encompasses both producers of "official statistics" and the larger category of "development data" and expressly leaves open the question of who counts as a "user" of development data and statistics. On the other hand, for capacity development, PARIS21 uses the UN Development Program's (UNDP) definition: "the process through which individuals, organizations and societies obtain, strengthen and maintain the capabilities to set and achieve their own development objectives over time" (UNDP, 2009, p. 5). Statistical capacity development, then, is the *process* by which individuals, organizations, and societies obtain, strengthen, and maintain capabilities to collect, produce, analyze, and disseminate high-quality and reliable statistics and data to meet users' needs to set and achieve their own development objectives. Thus, a nation's statistical capacity is directly linked to the ability to set and achieve development objectives that are country- or locally- owned.

As alluded to in the introduction, there is no doubt that there has been an increase of attention to official statistics and development data since the turn of the 21st century. This increased attention includes the creation of an international entity—PARIS21 in 1999—devoted to promoting the "better use and production of statistics throughout the developing world" as well as the highlighting of statistics and data as central to development work in the 2005 Paris Declaration on Aid Effectiveness and the increased "global commitments to statistics" from 336 USD million in 2007[5] to 693 USD million in 2018 (PARIS21, 2020, p. 2, 21). However, this is the newest phase of a longer trajectory: statistics have always been a critical part of the system of international and global governance. Within the UN system, the UN Statistical Office (later renamed the UNSD) was established in 1947 to "quantify the world" (Ward, 2004). Building off of the work of the statistical services of the League of Nations and the ILO, the UNSD and the statistical offices of other UN agencies and NSOs have worked since the 1940s to produce measurement standards for common benchmarks for development in national, regional, and global contexts. Changing in focus over time, both shaped by shifting international development philosophies and shaping the same, Ward (2004, p. 1) argues that statistics "have contributed to a continually evolving perspective of what is important and to the solution of the problems facing societies."

UNSD began convening the UNSC in 1947 to bring together representatives from different countries and agencies to make decisions about universal standards, explicitly designed to be a "representative body that reflected the different and often divergent political positions of the various national and international organizations that belonged to the statistical community" (Ward, 2004, p. 34). Mirroring the early emphasis of the UN system as a whole on economic development, the UNSC and the official statistical community initially focused on the development of national accounts, the "most important and expedient macroeconomic policy instrument so far devised" (p. 36). First established in 1953, the UN System of National Accounts continues to evolve, most recently revised in 2008, and continues to serve as a reference for countries to develop their national accounts to monitor economic activity, which includes the production of the gross domestic product (GDP) (Jerven, 2013). Coming relatively late to the growing call for attention to social factors of development, the statistical community turned its attention to the statistical standards for measuring health, education, and poverty in the late 1970s, including developing the UN Social Indicators Manual. By the 1990s, attention had shifted again to how we might measure the environment and our impact on it, including the development of a Green GDP.

The infrastructuring of the SDGs builds on these earlier forms of statistical development but, like earlier shifts, also reflects new ideologies of international development. The epistemic infrastructuring of the SDGs builds on the twinned and polarizing movements for more "harmonization" on the part of international organizations to align with national development priorities and for more increased monitoring of development projects on the part of donor entities in the 1990s. These movements were

[5] After the Paris Declaration, PARIS21 was called upon to begin collecting data about how much support low- and middle-income countries were receiving to help gather social, economic, and environmental statistics in their countries, and it often uses 2007 as its benchmark. Data on statistical support before 2007 are more patchwork in nature.

formalized by the Rome Declaration on Harmonization in 2003 and the Paris Declaration on Aid Effectiveness in 2005, within which harmonization and effectiveness were married with the concept of "managing for results," requiring careful tracking of input, process, and output indicators to monitor the impacts of different development interventions. The 2004 Marrakech Action Plan for Statistics framed the need for statistical capacity as *the* crucial tool for the management of development results. The need for these data to make aid effective on the national level was combined with global development goal setting, a movement that began with the goals proposed at UNICEF's 1990 World Summit for Children and the World Bank and the International Monetary Fund's Poverty Reduction Strategy Papers, and culminated in the MDGs and the SDGs. In this way, the push for statistical capacity development that began in the late 1990s was entangled with growing attention in international development that there was a misalignment in priorities between donors and countries receiving development aid as well as a growing movement for global governance via indicators that was itself entangled with an emphasis on producing accountability data on the part of donor recipients to donor countries. Calls for nationally owned development agendas and a "harmonization" of donor priorities with country priorities were accompanied by a demand for data on the part of donors, like never before, to monitor global goals. Thus, support for statistics in the current era always has to balance "two priorities" (Oxford Policy Management (OPM) et al., 2009, p. viii): that of producing nationally and locally relevant statistics for local policy and that of producing statistics for international organizations, global agendas, and fulfilling performance-based financing agreements. Statistics have thus been central in shaping the power dynamics within global policy agendas, on the one hand, to reposition goal-making as local, while also deploying statistics as a mechanism of accountability of the local to the global, on the other. These tensions between the national and the global fuel debates about what capacities and whose capacities are to be strengthened by SCD efforts.

These two priorities that must be balanced have led to what one development data expert called "two data systems" in countries that receive donor funding (Civil Society 1, 2020)—those produced and owned by countries and those produced by various public and private international organizations. Countries may have limited access to this latter category of data, which are largely created for these organizations' own monitoring and evaluation and may include social, economic, and environmental data that these countries do not collect about their own populations (Gimbel et al., 2018). The multiplicity of data streams has entrenched a decentralization away from government-centered statistics and data production in many countries with lower statistical capacity, leading to an increased fragmentation of what can be known about a country's population. This fragmentation predates the SDGs, but it has been accelerated by the monitoring demands of the SDGs, even though harmonization and consolidation of development data was a key reason for the promotion of better statistics and data in the first place. This fragmentation has led to what some have called the "distortion" of official statistics. In describing how this fragmentation "distorts things," one member of the community provided the example of the Bill and Melinda Gates Foundation (BMGF), who

> had given money to our colleagues in the World Health Organization to map the surveys in countries. But sometimes you have countries where you only have two people in the entire country that can design a survey. And when the money was coming in and the government was offered this money to run the tobacco survey, some countries did jump on that money, and they postponed their regular household income and expenditure survey, because they just didn't have the capability in the country to actually design and run a survey. (UN Statistician 3, 2020a)

In this way, the proliferation of supply-driven initiatives to support data production has the ability to distort the production of official statistics. Donor-led efforts to produce development data can have a detrimental effect on the statistical capacity of a country, even taking crucial personnel away from the production of official statistics in order to contribute to a parallel data stream. In the middle of these two streams is what one member of the community calls "statistical intermediaries":

> [There's] a whole class now of essentially 501(c)3 non-profit organizations who essentially do global advocacy on data for development, and they absorb a sizeable proportion now, an increasing proportion of overseas development assistance in the data space, but there's not a whole lot of capacity development going on here. (UN Statistician 13, 2021).

In response to this fragmentation of development data streams, statistical capacity itself has also been promoted as an infrastructure to be wielded by nations against a donor-driven development agenda and as a way of de-fragmenting these bifurcated data streams—a way to "fend off the donor" (UN Statistician 3, 2020a)—particularly through the development of National Strategies for the Development of Statistics (NSDSs). The goal of NSDSs is to put national statistical offices and their affiliate ministries in control of what a country needs to know about itself and its population, giving these offices the power to say no to donors offering funding for data production projects and putting in regulations to attempt to de-fragment data streams that very clearly use the same personnel and are a part of the same epistemic infrastructure. The push and pull of the national and global priorities for statistical capacity can be seen at every level of the epistemic infrastructure—the materialities, networks and processes, and policy paradigms of the SDGs. Turning to debates on how statistical capacity itself can be measured and monitored, the next section will show how these three levels of the infrastructure interact through statistical capacity.

Producing the epistemic infrastructure: measuring the measurable and measuring the measurer [6]

Deliberations over how statistical capacity and its development are measured is a crucial space for analyzing assumptions about the larger public good or purpose of official statistics. One of the pivotal moments of transforming SCD into its own development problem was inserting it into the SDG monitoring framework itself, as two targets of Goal 17, which has the overall aim to strengthen "the means of implementation and revitalize the Global Partnership for Sustainable Development" (United Nations (UN), 2020, p. 21), as can be seen in Box 1, which is how they stand as of mid-2022. The indicators for these two targets have evolved, reflecting debates about what counts as an appropriate measure of statistical capacity development, since the original framework put forward by the UNSC in 2015, as well as the one approved by the UN General Assembly in 2017. The group responsible for validating any changes to SDG indicators is the IAEG-SDGs,[7] which was established by the 46th UNSC in March 2015 "to develop an indicator framework for the monitoring of the goals and targets of the post-2015 development agenda at the global level, and to support its implementation" (UNDESA, 2015a, p. 1). This sample of the global statistical community has tried to grapple with these tensions between donor-led infrastructural intransigence and the push for local priorities, as well as tensions between what is measurable and what is not and how to measure an infrastructure that also includes themselves.

For many members of this community interviewed, the World Bank's Statistical Capacity Indicator (SCI), first developed in 2004, was the most widely used tool for measuring statistical capacity in the UN space—perhaps as close as the community comes to a consensus on the issue, even though there are many critiques of the indicator, acknowledged by representatives of the Bank themselves. In early 2021, the Bank introduced the Statistical *Performance* Index (SPI) as a replacement of the SCI to address some of these critiques. As an institution with a large impact[8] on this development problem, the World Bank's debates and philosophies at the center of its modes of financing and knowing about statistical capacity are of particular consequence, including the question of measuring infrastructures versus (data and statistical) outputs. Fundamentally, the World Bank asserts that data and statistical infrastructures, which include human capacity, are "clearly relevant information for gauging the capacity of an NSS [National Statistical System]" (Cameron et al., 2019, p. 15) but are very difficult to "capture." The recently phased out SCI was "used to evaluate the efficiency of statistical support provided to a country as well as the need to further develop its statistical capacity" (Cameron et al., 2019, p. 2). Yet, the SCI was criticized for "placing too much weight on statistical outputs and activities, while neglecting the infrastructure and resource components of statistical systems" (p. 5). Deploying the economic metaphor of a factory for manufacturing statistical products, Cameron and his colleagues describe this

[6] This formulation was inspired by MC Hammer, who called on us all to "include the measurer" when thinking critically about measurement.

[7] The group includes representatives from member countries, specialized agencies, UN Secretariat and Regional Commissions, regional and international organizations, and civil society.

[8] The World Bank was also widely referenced to be one of the most important international organizations—if not the most important—in statistical capacity development because the institution funds a large proportion of statistical development activities on the world stage. To illustrate this financial influence, from 2006 to 2015, the World Bank provided an average of $90 million a year to support "data activities" (Independent Evaluation Group (IEG), 2018, p. x), while the total official development assistance for statistical capacity ranged from $336 to $740 million for this same period (PARIS21, 2020, p. 21). Further, from 2016 to 2018, the Bank provided nearly a third of all bilateral and multilateral official development assistance ($610 million out of a total of $1.88 billion) to support "data and statistics" (PARIS21, 2020, p. 35).

Box 1: Statistical Capacity Development Indicators in the SDGs

Target 17.18: By 2020, enhance capacity-building support to developing countries, including for least developed countries and small island developing States, to increase significantly the availability of high-quality, timely, and reliable data disaggregated by income, gender, age, race, ethnicity, migratory status, disability, geographic location, and other characteristics relevant in national contexts

- 17.18.1 Statistical capacity indicator for SDG monitoring
- 17.18.2 Number of countries that have national statistical legislation that complies with the Fundamental Principles of Official Statistics
- 17.18.3 Number of countries with a national statistical plan that is fully funded and under implementation, by source of funding

Target 17.19: By 2030, build on existing initiatives to develop measurements of progress on sustainable development that complement GDP and support statistical capacity-building in developing countries

- 17.19.1 Dollar value of all resources made available to strengthen statistical capacity in developing countries
- 17.19.2 Proportion of countries that (a) have conducted at least one population and housing census in the last 10 years and (b) have achieved 100% birth registration and 80% death registration

statistical infrastructure as the "physical plant, the quantity and quality of computational facilities, and the number and skill level of workers" (p. 15). However, since it would be "costly and drawn out," the measuring of this infrastructure is purposefully excluded from the Bank's new SPI, so renamed from the SCI to address critiques that it does not, in fact, measure *capacity* (Ngaruko, 2008).

A crucial obstacle for the measurement of statistical *capacity* concerns the temporal dimension of an epistemic infrastructure:

> Capacity is difficult to measure since it is only partially revealed by evaluating achievements or other observable characteristics of the NSS. A system may have the capacity to produce quality data products but has not yet done so; or it may no longer have the capacity to produce despite having succeeded in the past. (Cameron et al., 2019, p. 8)

Statistical capacity is very much temporally structured—it is not static, and like all infrastructure, it requires diligent maintenance and is always in the process of becoming. The parts of the infrastructure that are funded and maintained change over time, changing the nature of the infrastructure itself. For example, support for regional "centers of excellence" for "training demographers and population statisticians in the Global South"—like the Regional Institute for Population Studies in Ghana or the Cairo Demographic Center in Egypt—was for decades a core component of UN statistical capacity development, but there has been a disinvestment in these modes of capacity development since the early 2000s (UN Statistician 13, 2021). Additionally, data and statistical infrastructures shape "the present through a politics of anticipation," aspiring for modes of measuring that exceed present needs (Gupta, 2018, p. 63). Within the World Bank's influential attempts to quantify this infrastructure, these acts (or lack) of maintenance and anticipation are very difficult or expensive[9] to capture, and so they are left to the side

[9] As Cameron et al. (2019, p. 14–15) argue: "A second missing dimension might be *statistical infrastructure* as represented by the underlying array of inputs that the NSS has at its disposal for producing and disseminating data. This could include the physical plant, the quantity and quality of computing facilities, and the number and skill level of workers, among other inputs. All of these are clearly relevant information for gauging the capacity of an NSS. However, it is also clear that implementability [of the measurement exercise] would once again be a problem, since gathering accurate, homogenous data on inputs would be a costly and drawn out task."

in preference for snapshots of the present, which strips the infrastructure to produce official statistics and development data of its temporal component.

Debates about what should be included within the SDG indicator for measuring statistical capacity are folded into debates about what is included within the data and statistical infrastructures themselves. Many within the global statistical community have argued that not only must we think of these infrastructures temporally, but we also must expand our concepts (and measurements of them) to include the people, economic engines, and governance systems that make them run. The same national statistician mentioned in the introduction—a representative of the Samoa Bureau of Statistics and Fiji Bureau of Statistics—immediately followed up his point about it being "HIGH TIME" to include SCD as a development objective in its own right with an assertion that the measurement as it existed in the original SDG framework captured neither capacity nor its strengthening (UNDESA, 2015b, p. 4):

> [We] strongly believe that we require a better indicator, something that builds on the World Bank's SCI, but which would allow the measurement of 3 core components of national statistical capacity: a. Human capacity (trained, experienced staff to do their job); b. Financial capacity (with Governments providing more than just 'shoe-string' budgets for their NSOs that extend beyond payment of salaries, and actually enables NSOs to do their jobs); and c. Political-institutional capacity, that embraces a culture of evidence informed policy development, planning, monitoring of progress and accounting for results – which requires access to quality and timely statistics.

Statistical capacity—here broken down into the categories of human, financial, and political-institutional—was not captured by the earliest versions of the indicators to measure statistical capacity development, which focused on national statistical legislation, coordination of official statistics, and a couple of indicators that were meant to serve as alternate representations of national progress in opposition to the GDP. This representative made clear just how important it was for the SDG indicators to attempt to measure the conditions by which development data could be produced on the national level, rather than more easily measurable proxies for this capacity.

This would include attempting to incorporate means of measuring the measurers themselves into a holistic view of the statistical infrastructure. Some members of the global statistical community saw themselves as inherently part of the infrastructure that must be measured, which made it an uncomfortably recursive process to find an appropriate means of measuring statistical capacity. As one statistician put it:

> Measures also sometimes lead to decisions and maybe distorted decisions, especially when you have an index. […] So, I think the *hesitance of this measurement community to define a measurement for themselves is also because they are very aware of what measures do to people*. (UN Statistician 3, 2020a, my emphasis)

Illustrating "what measures do to people," this member of the community provided an example of how the MDGs measured gender parity or equality: only three fundamental measures were chosen for representing progress on gender issues, and one of them was the number of women in parliament. Meaning that, as a country, "one third of your measure by which you communicate to the rest of the world whether you're paying attention" to the problem of gender equality is the number of women in parliament and then "maybe more effort will go into that, which […] can be more easily influenced than, for instance, wage gaps" (UN Statistician 3, 2020a). This has the ability to "distort" national level policy to address the problem of gender inequality in the way that the indicators define it, leading to countries increasing the number of women in parliament without addressing other more fundamental gender issues. A key means of limiting this distortion, to use this community member's language, is the existence and implementation of NSDSs, which countries' NSOs design in order to set their own priorities for statistical development. Indicator 17.18.3 is a simple count of how many countries have these and have implemented them, for which PARIS21 is the custodian agency.

Coming to a consensus on a means of measuring statistical capacity requires coming to a compromise that can shape what kinds of materialities, networks, and policy approaches are included in the statistical infrastructure in the future. When it comes to activities and approaches to the building blocks of this infrastructure, different international organizations have their own definitions of what counts as statistical capacity development. One member of the global statistical community tied these different

modes of statistical capacity explicitly to IOs' "business models" and separated these organizations into two distinct camps—those who want to support a "sustainable, sustained statistical system" or those who want to get the "best estimates" for monitoring, advocacy, and planning:

> [the US Agency for International Aid (USAID)] is clearly: we need this data for our programming; they should be useful to government; we will assure quality by doing it ourselves more or less and bring a couple of people to Baltimore […] [BMGF] is a little bit more complicated because sometimes they're really supportive to local systems. […] And then on the other extreme, you have [the Institute for Health Metrics and Evaluation (IHME)], which most of the time, […] I suppose, [uses] the USAID/WHO approach, which is: we want the technical excellence and so we will do whatever we can to make that happen. […] *Is your goal to build a sustainable, sustained statistical system*, or *is your goal to get the best estimates that you need for the advocacy or the planning that you need to do?* And they don't easily go together. I mean it takes a lot longer, and it's much harder work to build the national capacity to do it. (UN Statistician 10, 2021, my emphasis)

Pointing to the distinction between attempting to promote a sustainable infrastructure or the mere existence of data as measures of statistical capacity, this community member was arguing, as many others have (e.g., Avendano et al., 2021; Badiee et al., 2017), that current modes of promoting statistical capacity often do not succeed in their goals. Badiee et al. (2017) separate the main funding modalities for statistical capacity into six categories: domestic tax revenues, loans and credit, bilateral grants, technical assistance, results-based aid, and pooling arrangements. Each have their strengths and weaknesses, but key weaknesses are that they often produce data for the funding agency rather than the country or promote short-term trainings to help statisticians learn certain methodologies, without particular attention to the country's long-term needs. The misalignment of what constitutes statistical capacity can in this way detract from both the UN agencies' and the country's priorities. Rather than understanding these fragmentations as outside of the epistemic infrastructure, however, it is important to analyze them as intrinsic to the incomplete, iterative infrastructure, as further discussed below.

Discussion: unresolved tensions between the global and the national in the epistemic infrastructure of the SDGs

In 2009, the authors of a study commissioned by the Paris Declaration Evaluation and the Department for International Development to study the progress made on developing statistical capacity asserted that one of the fundamental sticking points in pushing forward the Paris Declaration priority of SCD was one of the central problems that the Paris Declaration was meant to address: "what gets funded gets done, and this often reflects the statistical priorities of the funders more than those of governments" (Oxford Policy Management (OPM) et al., 2009, p. ix). They go on further to argue that evidence "from the study suggests that cooperating partners have not always provided support to statistics that endorses all the recipient governments' priorities" (p. viii). The SDGs' participatory logic was meant to firmly put countries in the driver seat, yet this tension between global and national priorities has been baked into the epistemic infrastructure of the SDGs itself. The NSS—and the larger data ecosystem that it sits within—is a fundamental part of statistical capacity on both a national and global level, yet debates on how it is strengthened and for what aims are a key component of the epistemic infrastructure itself.

We might ask what this stubborn tension in the support of statistical capacity does for the maintenance of the epistemic infrastructure of the SDGs as a whole. In his analysis of the development industry in Lesotho in the 1970s and 1980s, James Ferguson (1994) showed how rural development projects were set up to fail and that failing projects were a key modality for keeping the development industry functioning. In the context of statistical capacity, infrastructural and development temporalities converge in promoting the "future positive" for producing sustainable development policy (Edwards, 1999)—the politics of anticipation is an engine for producing new funding modalities, new modes of discourses about data and statistics, and new partnerships and organizations in the field of statistical capacity. These "failures" and tensions are part and parcel of the ways that organizations maintain their institutional identities and produce coherent narratives about themselves (Douglas, 2012; Mosse, 2004). In this way, arguments about what counts or does not count as an activity to support statistical capacity may not have an effect on different international organizations' approaches, no matter how participatory the SDG monitoring framework is set up to be. Because of the existing infrastructure to support

statistical activities—which has often been focused on UN agencies and other international organizations in the UN space providing support in order to get the data or statistics that they need in order to support their own programming (Badiee et al., 2017; Keijzer & Klingebiel, 2017)—the epistemic infrastructuring of the SDGs has "built upon [this] installed base" of statistical capacity development (Star & Bowker, 2002, p. 151). The official statistics and development data epistemic infrastructure has been fueled by the competing goals of promoting local policy priorities and fulfilling accountability agreements between donors and the recipients of their aid. "Capacity" within this epistemic infrastructure is then inherently flexible, leaving wide open the questions of for whom and for what purposes these capacities operate. Attempts to support alternative means and more nationally or locally focused statistical capacity development—like the development of NSDSs—must contend with the intransigent infrastructuring of these preexisting relationships between countries and international organizations that help countries produce the data and statistics they need for global monitoring. These relationships are also the engine that drives the SDG monitoring framework itself.

As one member of the global statistics community put it: "I think the hesitance of this measurement community to define a measurement for themselves is also because they are very aware of what measures do to people" (UN Statistician 3, 2020a). With ample examples of how measurement helps shape policy problems, many in this community are aware of the stakes of defining the conditions by which statistical systems themselves are defined as "at capacity" to monitor national, regional, and global development agendas. In this way, as UN agencies and other international organizations demarcate statistical capacity by providing specific forms of support to countries for producing development data, unresolved debates about *whose* capacities and for *what* purposes are built into the very structure of monitoring and promoting the SDGs, which fits into larger debates about the concept of capacity in international development.

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