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Items for discussion and decision: Data Stewardship

Background document
Available in English only

Preliminary results from the Working Group on Data Stewardship

Prepared by the Working Group on Data Stewardship

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Introduction and emerging headlines

1. This background document provides supplementary reading on the five workstreams of the Working Group on Data Stewardship, which cover data governance, equity and inclusion, sharing and collaboration, links with the city data agenda and development of an overall conceptual framework. As described in the report transmitted to the fifty-third session of the UN Statistical Commission[1], the Working Group was established by the Commission at its fifty-second session and builds on initial work done under the High-level Group for Partnership, Coordination and Capacity Building for statistics for the 2030 Agenda for Sustainable Development (HLG-PCCB)[2]. It is composed of representatives from National Statistical Offices (NSOs) and stakeholders from other data communities, including international and regional organizations and civil society organizations. The Working Group was tasked by the Commission with exploring ways forward to develop guidance for NSOs on approaches to data stewardship.

2. The background document includes 5 main chapters presenting more detailed thinking and preliminary results from each workstream under the Working Group on Data Stewardship (see Annex I on organizational membership). Several headlines stand out from this initial work made more compelling by the fact that the workstreams (WS1 – 5) come to similar results despite starting from very different perspectives. These emerging headlines suggest there are three priorities to consider when adopting a data stewardship approach:

a. focus on data use and data as a strategic asset
b. help the data ecosystem to adopt ethical standards and ensure an inclusive approach throughout the data value chain
c. develop a whole-of-government approach to data

3. In further describing the first priority on data use, WS5 found from a series of interviews it conducted, one of the four main purposes of data stewardship is “governing the data ecosystem to improve the use and reuse of data for the public good”. WS1 in their chapter discusses the need for an improved approach to governance on data use in response to the adoption of data protection legislation in over 100 jurisdictions around the world mirroring the implementation of the General Data Protection Regulation (GDPR) in the European Union. In addition, WS4 stresses in their chapter the role of a data steward as “creating value from data first, … expanding to an enabler of data quality second”.

4. The second priority on ethics and inclusion according to WS5 in their chapter requires “the ethical and responsible creation, collection, management, and use of data”. WS2 adds in their chapter that this requires the NSO to commit to three tasks: “identify barriers and

[1] United Nations Statistical Commission. E/CN.3/2022/5. Report of the Working Group on Data Stewardship for the 53rd session, 1-4 March 2022, Item 3(a). (found here).
[2] United Nations Statistical Commission. Approaches to data stewardship, Background document for the 52nd session, 1-3,5 March 2021, Item 3(a) (found here).

enablers to widespread use of data by different stakeholders in society", "inclusive and equitable policies and practices" and to "foster inclusion of different communities along the data value chain". The priority on ethics and inclusion includes managing concerns and opportunities around the use of privately held data, Artificial Intelligence (AI) and Machine Learning (ML) which is mentioned further by the chapters of WS1 and WS2.

5. On the final priority requiring a whole-of-government approach, the chapter from WS1 discusses the use of "horizontal data governance" as a response. While other chapters state their work will explore this area further with a "common understanding of the data ecosystem" (WS3), by looking at the function of a NSO to "facilitate coordination and cooperation between data providers and users" (WS5) and how it can generate improvements in "NSO products, services, and the user experience" (WS4).

6. Another important aspect to consider is the NSO's starting point to act on these priorities and how this is affected by different development contexts. There is a starter discussion in the WS1 chapter on the "prerequisites for an NSO to take on additional roles as a data steward". Additionally, WS3 has begun to collect several case studies on sharing and collaboration, see Annex III showing several good examples. Finally, WS5 will investigate further what it means for NSOs to contribute to "data protection, standardization, and quality to build and maintain trust" as part of its work on the conceptual framework.

Data Governance: workstream 1 (WS1)

Lead(s): Statistics Poland/ World Privacy Forum (see Annex I for other members)

Background and update on data governance and legal frameworks

7. Data governance norms and legal frameworks have shifted considerably in recent years, creating new, complex, and sometimes conflicting policies regarding data governance and data stewardship for National Statistical Offices (NSOs). The key trends of today regarding legislation, governance models, and best practices around data governance in NSOs and across governments have begun to converge in several key areas. Much of the current work regarding NSO governance and legal frameworks has attempted to harmonize on one hand the broader availability of public and private datasets and increased government use of data for development and other purposes, with the effects of the maturation and global spread of national and regional data privacy and protection legislation on NSOs on the other. Adding to these developments is the maturation of high-level multistakeholder discussions regarding the scope and function of roles for NSOs in data stewardship and data governance. Additional issues relating to Artificial Intelligence (AI) policy, specific types of data governance - such as moving from traditional models to whole-of-government and other decentralized types of governance models - are also emerging amongst NSOs, albeit more slowly.

8. The year 2014 was a watershed moment in the history of data governance as it marked the point when ideas about data diverged, highlighted by two extraordinary events. The report, *A World That Counts: Mobilizing the data revolution for sustainable development*,[3] was published and largely focused on the Sustainable Development Goals (SDGs) and what could be done with data as a social good. It crystallized emerging ideas at the time regarding how data could be used for development. This was fresh thinking, and it was a ground-breaking report. In the same year, the European Union (EU) supported legislation designed to usher in a new data governance ecosystem that would provide for new restrictions on data uses. [4] In a landmark speech on International Data Privacy Day 2014, the then EU Vice-President, Viviane Reding called for a new data protection compact to rebuild trust in the digital economy. Vice President Reding noted: "Europe must act decisively to establish a robust data protection framework that can be the gold standard for the world. Otherwise, others will move first and impose their

[3] *A World That Counts, Mobilizing the data revolution for sustainable development. Prepared at the request of the United Nations Secretary-General by the Independent Expert Advisory Group on a Data Revolution for Sustainable Development. N*ovember 2014. https://www.undatarevolution.org/wp-content/uploads/2014/11/A-World-That-Counts.pdf. See also: https://unstats.un.org/sdgs/hlg/.

[4] The inception of the GDPR began as a European Commission data protection reform package in 2012. In March 2014, the European Parliament voted in plenary in support of the GDPR, with 621 in favor, 10 against, and 22 abstentions. The final adoption of the new regulation was in 2016, with enactment taking place 25 May 2018. See: https://edps.europa.eu/data-protection/data-protection/legislation/history-general-data-protection-regulation_en.

standards on us."[5] This approach was then formalized in the years-long development of what would become the final form of the General Data Protection Regulation (GDPR) in Europe.[6] The GDPR was adopted in 2016 and went into effect in 2018. Since 2018, the GDPR has thoroughly impacted data governance, data protection, and data stewardship at NSOs and elsewhere.

9. The GDPR was not the first data protection legislation in the EU; it was preceded by the 1995 *Directive 95/46 EC*, Europe's early Data Protection Directive.[7] The 1995 Directive established a formal governance structure of Data Protection Authorities (DPAs) to enforce the directive at the member state level, among other bureaucratic structures. The GDPR was bold in its extension of the ideas of the original directive. The extra-territorial scope of the GDPR, and its emphasis on risks associated with data along with other modernizations, eventually shifted the earlier discussions of *breadth of data uses for social good*, to one geared toward *risk-based decision-making* with copious mitigations for various types of data risks, such as data breaches or inappropriate uses.

10. Another factor in GDPR's substantial impact was the subsequent spread of "GDPR-like" regulations across the globe beginning in 2017, with legislation reaching over 100 jurisdictions within the space of a few years.[8] As of 2022, the number of jurisdictions with national data governance legislation with high similarity to GDPR stands at 145 and counting. This ongoing legislative wave presents complex challenges as NSOs seek to understand how they can adapt and continue to serve their constituencies utilizing data as a social good in a modern data governance world.

11. Initially, data governance and stewardship tensions for NSOs did not generally arise from obstacles posed directly by the language of GDPR and GDPR-like legislation. GDPR contains thorough derogations, or formal exemptions, for research, which specifically enables the work of NSOs.[9] But with the derogations came an unintended vacuum for NSOs that has taken years to fully perceive in its full impact; that is, the role of NSOs was not conceived of in broad, whole-of-government terms at the inception of the GDPR. The research exemption

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[5] Viviane Reding, Speech: *A data protection compact for Europe*, CEPS, Brussels. 28 January 2014. https://ec.europa.eu/commission/presscorner/detail/de/SPEECH_14_62

[6] *The History of the General Data Protection Regulation*, European Data Protection Supervisor. https://edps.europa.eu/data-protection/data-protection/legislation/history-general-data-protection-regulation_en.

[7] European Parliament and Council Directive 95/46/EC of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data [Official Journal L 281 of 23.11.1995]
https://eur-lex.europa.eu/legal-content/EN/LSU/?uri=celex:31995L0046

[8] G. Greenleaf 'Global data privacy laws 2021: Despite COVID delays, 145 laws show GDPR dominance' (2021) 169 Privacy Laws & Business International Report, 1, 3-5 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3836348>.

[9] *General Data Protection Regulation*, Chapter 9, Art. 89. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32016R0679. *Note:* European member states may have additional derogations regarding statistical work. See: *Derogations Tracker*, GDPR Resource Center, Lathan & Watkins. https://gdpr.lw.com/Home/Derogations

simply removed NSOs from the broader data governance ecosystem. Instead of an exemption from the GDPR, in hindsight, NSOs could have negotiated for a proactive, broad leadership role as the governments' leading data experts, and urged legislative backing to fully support these activities across the government. GDPR compliance remained with Data Protection Authorities, or Data Protection Offices, which became over time the de-facto data governance authorities for governments. In the case of the European Union, this problem remains vivid and valid also for the subsequent or soon to be introduced legal acts related to data governance, such as the Directive on open data and the re-use of public sector information, also known as the "Open Data Directive"; an implementing act on high-value datasets; as well as two major legislative proposals: a governance framework for common European data spaces, the "Data Governance Act"; and a "Data Act".

12. The combination of broad statistical and research derogations and a separate data authority for compliance and data governance policy has in the mid-term created substantial unintended tensions for NSOs. The crux of the tension turns on the matter of how NSOs can collaborate widely across the government regarding data governance, agreements, uses, standards, and data stewardship, among other issues. While challenges remain, there has been progress. Current dialogues amongst NSO stakeholders encompasses the complex ideas around how NSOs can engage with modernized governance structures and become trusted stewards of data, in line with expectations derived from the new data governance laws, working, for example, in cooperation with privacy authorities, and with other relevant government authorities. These conversations have been fruitful, and have led to new research, advances in interoperable public sector data governance models, and have also created an impetus for sharpened data governance within NSOs.

13. In 2019 the Conference of European Statisticians initiated a review of existing practices at NSOs. The resulting report[10] included 17 recommendations regarding Data Stewardship and NSOs. Of the recommendations stemming from this work, that of creating administrative data governance structures vertically within NSOs is particularly important. Also important was the finding that there was an absence of horizontal governance for strategic direction on data issues (Canada).

14. In the new vertical and horizontal roles being contemplated, NSOs would ideally update their internal governance models and assume a leadership or an advisory role in horizontal data governance and stewardship across government. This was an elegant proposal to bridge some of the gaps regarding NSOs roles in government data governance ecosystems. The topic of data stewardship was also the focus of the 52nd session of the UN Statistical Commission High Level Event in February 2021, *Data stewardship and the role of National Statistical Offices in the*

[10] *The role of national statistical systems in the new data ecosystem*, 67th session of the Conference of European Statisticians, June 2019. ECE/CES/2019/25.

changing data landscape,[11] which set forth a path to develop data stewardship and governance capacities for NSOs.

15. In a 2021 workshop report from Statistics Poland and Eurostat, a survey of the members of the European Statistical System (ESS), found that all responding NSOs (NSIs in the report) reported that they extensively collaborate with other government bodies on issues related to data and information management processes, in principle enabled by legislation.[12]

16. The survey also found that a significant number of NSOs reported that a framework of a "national data strategy" or a "national data sharing legislation" exists, or it is part of ongoing work. Most respondents explained that a data stewardship role exists within their respective strategic framework of a "national data strategy." In principle, data stewardship responsibilities are either directly under the NSO, or the NSO actively contributes to relevant activities; however, for all responding NSOs, legal provisions imply that the data stewardship role is not entrusted to the NSO; nonetheless, NSOs are involved and contribute with their capacity and competencies in data and information management.

17. Although the data governance landscape has changed radically since 2014, there are clear indications that even in the absence of new legislative mandates, NSOs are moving to adapt to the changes with new governance activities and expanded roles. The high-level work from the Conference of European Statisticians seeking to address the horizontal and vertical aspects of the NSO governance ecosystem is a clear indication that more nuanced, sophisticated balancing between the uses of data and data protection are emerging. Regional rates of change and approaches differ widely, and the details of how NSOs fit within their legislative context, among other contexts, are important to consider.

Country approaches: case studies

18. Data governance has proven to be highly contextual in the modern data world. The implementation of GDPR, which has been uneven and has presented significant challenges,[13] confers useful governance case studies in this regard.[14] Given what has been learned from the practical implementation of the GDPR, it is unlikely that a single, one-size-fits-all approach to NSO data stewardship and data governance would be feasible. As NSOs chart their course in

[11] *Data stewardship and the role of National Statistical Offices in the changing data landscape,* UN Statistical Commission High Level Event, UN Statistics, February 2021. https://unstats.un.org/unsd/statcom/52nd-session/side-events/20210210-1M-data-stewardship-and-the-role-of-NSOs-in-the-changing-data-landscape/.

[12] *Results of the survey of the ESS on public data governance and data stewardship — Follow up of the Workshop of Directors-General on Data Stewardship*.

[13] Axel Voss, *Fixing the GDPR : Towards Version 2.0*. EPP Group, European Parliament. 25 May 2021. https://www.axel-voss-europa.de/wp-content/uploads/2021/05/GDPR-2.0-ENG.pdf

[14] Michael Pisa , Pam Dixon , Benno Ndulu and Ugonma Nwankwo, *Governing Data for Development: Trends, Challenges, and Opportunities*, Center for Global Development, November 12, 2020. https://www.cgdev.org/publication/governing-data-development-trends-challenges-and-opportunities.

their national and regional contexts, over time, it will be possible for high-level principles to emerge from analysis of effective practices, and with effort, regional adaptations can become standardized and more broadly understood and adopted, including in formal legislation. Several use cases are helpful in comparing country approaches.

A. New Zealand

19. New Zealand established a Government Chief Data Steward (GCDS) role in 2017 via mandate, and as such has already had several years to produce a body of work and practice regarding data stewardship.[15]

20. The Chief Data Steward is role is filled by the Chief Executive of Statistics New Zealand, or Stats New Zealand. The role has several functions: to set mandatory standards, to enable a "common approach to the collection, management and use of data across government," and to "direct the adoption of common data capabilities." Notable work the Government Chief Data Steward has accomplished includes the development of a 3-year Data Strategy and Roadmap,[16] leadership in developing transparency and accountability for AI in the government context,[17] the development of a broad Data Stewardship Framework, and work on open data, among others. Most recently, the GCDS released a report on COVID-19 lessons learned and recommendations.[18]

21. Structurally, New Zealand has created a framework of data stewardship protection that is inclusive and interdependent across the whole of government. New Zealand describes its data stewardship framework as including a range of roles with governance functions in New Zealand's data system, including the:

- Government Chief Data Steward,
- Government Chief Information Security Officer,
- Government Chief Digital Officer, and
- Government Chief Privacy Officer.

The Privacy Commissioner, Ombudsman, Auditor General, and Chief Archivist are other roles.

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[15] *Government Chief Data Steward Mandate*, Office of the Minister of Statistics New Zealand. https://www.stats.govt.nz/assets/Uploads/Corporate/Cabinet-papers/Strengthening-data-leadership-across-government-to-enable-more-effective-public-services/strengthening-data-leadership-across-government-to-enable-more-effective-public-services-redacted.pdf.

[16] *The Government Data Strategy and Roadmap*, Government Chief Data Steward, September 2021. https://www.data.govt.nz/leadership/strategy-and-roadmap/.

[17] *Algorithm Assessment Report*, Stats NZ, 2018. https://www.data.govt.nz/toolkit/data-ethics/government-algorithm-transparency-and-accountability/algorithm-assessment-report/.

[18] COVID-19 Lessons Learnt: recommendations for improving the resilience of New Zealand's government data system. Stats NZ Tatauranga Aotearoa, March 2021. https://data.govt.nz/docs/covid-19-recs-report/.

22. The Privacy Commissioner's role is defined in the New Zealand *Privacy Act of 2020*, which has 13 information privacy principles, and requires agencies to report certain data breaches to the Privacy Commissioner. New Zealand's privacy laws are aware of GDPR, and as such it qualifies as a modern data protection law,[19] but the Act is not identical to GDPR and uses different terminologies.

23. New Zealand's approach to algorithms, or AI and Machine Learning (ML), has been progressive. In 2018, New Zealand released its *Algorithm Assessment report*, which covered the practices of 14 government agencies.[20] It is among the earliest instances of a robust, mature discussion of data governance, management, standards, stewardship, open data, and privacy in the area of government use of algorithms. The 2018 report led to the July 2020 release of the *Algorithm Charter for Aotearoa New Zealand* by the Minister of Statistics.[21] The Charter is notable for its approach to human oversight, which provides for means of appeal of decisions informed by AI. New Zealand also released an algorithm toolkit to implement the charter.[22]

24. Recently, Stats NZ has begun a new program it has branded *Data Ventures*.[23] Under the auspices of this program, Stats NZ is producing statistical work in collaboration with data holders outside of government. The use of sensitive private sector data sets is a critically important area for NSOs to address with meaningful governance and policy structures. One exemplar of Data Ventures' work is a report and data visualization from early 2021 that was produced with the support of Qrious and Vodaphone. The report analyzed COVID-19 impacts on change in population mobility over time, down to the suburb level.[24]

25. The report is notable regarding its attention to data protection and governance, in that it provides excellent transparency in regard to its use of telecommunications and other data, and also provides clear and conspicuous links to all relevant policy documents. The report noted on its opening page the following information:

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[19] Graham Greenleaf, *Global Tables of Data Privacy Laws and Bills* (7th Ed, January 2021) (February 11, 2021). 169 Privacy Laws & Business International Report. 6-19, https://ssrn.com/abstract=3836261 or http://dx.doi.org/10.2139/ssrn.3836261.

[20] *Algorithm Assessment Report*, Stats NZ, 2018. https://www.data.govt.nz/toolkit/data-ethics/government-algorithm-transparency-and-accountability/algorithm-assessment-report/.

[21] Algorithm Charter for Aotearoa New Zealand, Stats NZ. July 2020. https://www.data.govt.nz/assets/data-ethics/algorithm/Algorithm-Charter-2020_Final-English-1.pdf].

[22] *Government Algorithm Transparency and Accountability*, Stats NZ. March 2021. https://www.data.govt.nz/toolkit/data-ethics/government-algorithm-transparency-and-accountability.

[23] *Data Ventures*, Presentation, Stats NZ. https://www.data.govt.nz/assets/Uploads/Data-Ventures-Presentation-Drew-Broadley.pdf. See also: *Data Ventures* website: https://dataventures.nz/

[24] *COVID-19 Impact on Local Councils' CBD Population through to 2021*, Data Ventures NZ, 28 January 2021. https://reports.dataventures.nz/bespoke/local-council-cbd-patterns/20210128-covid-19-council-cbd-behaviour-january-2021.html.

Data Ventures is working together with the major telecommunication companies in New Zealand.

Using the aggregated and anonymised mobile data provided to them, along with Stats NZ expertise, Data Ventures has created population estimates of residents and visitors in New Zealand every hour down to suburb level.

26. The summarized figures and data in the report were also made available to the public via Data Ventures NZ's GitHub repository.[25] For those wishing to understand more about how the mobile phone data was utilized, where, and at what time increments, the GitHub repository provides a high degree of transparency about what data was utilized, as well as the analytical methodology. These are promising efforts. While it is still early in the project, the Data Ventures model is an important one to study over time.

B. Canada

27. Canada's approach has been to build an interconnected, government-wide system based first on principles (ethics, privacy, transparency) and followed up by data standards, guidelines for metadata, data protections, and data quality.[26] Canada amended its *Statistics Act* substantively in 2017[27]

28. In Section 5 of the *Statistics Act*, 10 privacy and data governance principles are put forward: [28]

Principle 1: Accountability
Principle 2: Purpose
Principle 3: Consent
Principle 4: Limiting Collection
Principle 5: Limiting Use, Disclosure and Retention
Principle 6: Accuracy
Principle 7: Safeguarding Personal Information
Principle 8: Openness
Principle 9: Individual Access
Principle 10: Challenging Compliance

[25] Data Ventures NZ repository, github. https://github.com/dataventuresnz/mobility-index/ -index/k
[26] *Roles of NSO in the new data ecosystem: Data stewardship discussion at the Conference of European Statisticians and in Canada*. https://www.cepal.org/sites/default/files/presentations/sca-ec.19-statcanada-data-stewardship-conference-european-statisticians-and-canada_0.pdf.
[27] Statistics Act (R.S.C., 1985, c. S-19), last amended 2017. https://laws-lois.justice.gc.ca/eng/acts/S-19/FullText.html
[28] *Privacy Compliance Analysis*, Statistics Canada, 2020. https://www.statcan.gc.ca/en/about/pia/generic/section5.

29. These principles were not developed in isolation; they also form the basis of Canada's directive on conducting Privacy Impact Assessments (PIAs).[29] The Canadian principles used in its updated *Statistics Act* are further strengthened because they are formal Canadian standards, and they also map directly to the primary data governance standards that have international consensus, called Fair Information Practices (FIPs). FIPs were originally developed by a U.S. advisory committee in 1974 and then expanded into their modern form by the OECD in 1980.[30] The FIPs still form the broad basis of many data protection laws today, although now, additional principles stemming from GDPR are often built on top of them.[31]

30. As mentioned, Canada created a formal privacy and data governance standard. The ten principles seen in Section 5 of the *Statistics Act* are in fact the principles that the Canadian Standards Association published in 1995 as a National Standard of Canada (The CSA standard). The CSA standard is the foundation of both the Statistics Act and Canada's privacy legislation, the *Personal Information Protection and Electronic Documents Act* (PIPEDA), which applies to the Canadian private sector. PIPEDA originally passed in 2000.[32]

31. Canada's decision to utilize a formal national data governance standard in core legislation horizontally across its government has given them increased facility to align work vertically and horizontally across sectoral domains, which can be clearly seen in the appearance of the CSA standard in the statistical context. The model of creating a formal data governance and privacy standard as a way of unifying governance approaches has proven useful in the Canadian context.

32. In 2021, Statistics Canada released its *Framework for Responsible Machine Learning Processes at Statistics Canada.*[33] The framework is not enacted by legislation - it is a set of recommended guidelines to apply to all statistical programs and projects conducted by Statistics Canada that utilize Machine Learning (ML), inclusive of outward and inward-facing work. The broad cornerstones of the guidelines include respect for people, respect for data, sound methods, and sound application. The framework utilizes self-evaluation, peer review, checklist, and dashboard reports for self-assessments.

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[29] *Generic Privacy Impact Assessment for Statistics Canada's Statistical Programs*, Statistics Canada, 2022. https://www.statcan.gc.ca/en/about/pia/generic/section5.

[30] *OECD Guidelines on the Protection of Privacy and Transborder Flows of Personal Data*, OECD, 23 September 1980. https://www.oecd.org/sti/ieconomy/oecdguidelinesontheprotectionofprivacyandtransborderflowsofpersonaldata.htm.

[31] Robert Gellman, *Fair Information Practices: A Basic History* - Version 2.21 (September 3, 2021). Available at SSRN: https://ssrn.com/abstract=2415020 or http://dx.doi.org/10.2139/ssrn.2415020

[32] *Personal Information Protection and Electronic Documents Act* (PIPEDA), Government of Canada. https://priv.gc.ca/en/privacy-topics/privacy-laws-in-canada/the-personal-information-protection-and-electronic-documents-act-pipeda/r_o_p/. PIPEDA was enacted in 2000. Its most recent update was in 2019.

[33] *Framework for Responsible Machine Learning Processes at Statistics Canada*. May 2021. https://www150.statcan.gc.ca/n1/pub/89-20-0006/892000062021001-eng.htm.

C. Mauritius

33. Mauritius is an important case study due to the presence of a strong legal basis for both the Mauritius NSO as well as a strong legal basis for the Mauritius Data Protection Authority within a small island country. Mauritius has had a statistical office since 1945. Its first legal statistical framework, *The Statistics Act*, dates to 1951, which was updated and replaced by the *Statistics Act 2000*. The NSO is situated under the Ministry of Finance and Economic Development, and is the central statistical authority for Mauritius.[34]

34. Statistics Mauritius has set forth a *Code of Practice* (2013)[35] that is consistent with the *United Nations Fundamental Principles of Official Statistics*[36] and the *African Charter on Statistics*.[37] The NSO produces a variety of statistical products, such as censuses and surveys. Of interest for this discussion is a 2010 Highlights Summary of Governance Statistics.[38]

35. One measurement in the summary of governance statistics is the "Level of governance compared to other African countries":

> Based on the Mo Ibrahim Index, Mauritius was rated first in terms of good governance among 53 African countries in 2008/09. The index which ranges from 0 (low governance) to 100 (high governance) stood at 83.0 for Mauritius.

36. The Ibrahim Index[39] deserves further consideration and discussion. It has been published since 2007, and assesses governance in 54 African countries in the areas of security and rule of law, participation, rights and inclusion, foundations for economic opportunity, and human development, with a total of 300 subcategories that can be measured, such as health, gender, and sustainable development. In 2020 the index was given a comprehensive update which included an updated theoretical framework.

37. While the Ibrahim Index does not specifically refer to data stewardship roles in NSOs, it is an important model for regions and countries. The Index provides measurement of governance by scores, and by trends, which shows deterioration or improvement of

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[34] Statistical legislation in Mauritius from 1951- 2017. https://statsmauritius.govmu.org/pages/About_Us/Legislations.aspx.

[35] *Code of Practice of Official Statistics*, Mauritius. Sept. 2013. https://statsmauritius.govmu.org/Documents/Homepage/Code_of_Practice.pdf.

[36] *Fundamental Principles of Official Statistics*, United Nations Statistics Division, (A/RES/68/261 from 29 January 2014). https://unstats.un.org/unsd/dnss/gp/fundprinciples.aspx.

[37] *African Charter on Statistics*, African Union. 8 February 2015. https://au.int/sites/default/files/treaties/36412-treaty-african_charter_on_satistics_eng.pdf .

[38] *Mauritius Governance Statistics*, Statistics Mauritius, 2010. https://statsmauritius.govmu.org/Pages/Statistics/ESI/Governance/GOVERNANCE-STATISTICS-2010.aspx

[39] Ibrahim Index, https://mo.ibrahim.foundation/iiag.

governance. The index holds possibilities for further utilization and refinement in the NSO governance context as well as a broader data stewardship context, and it may be particularly useful in a development context.

38. As noted previously, the Mauritius statistical framework interacts with the country's data protection framework, the *Data Protection Act of 2017*, which came into force in 2018.[40] The *Data Protection Act* provides a lawful basis for the NSO activities by specifically allowing historical, scientific, or statistical research, with some exceptions where "the security and organisational measures specified in section 31 are implemented to protect the rights and freedoms of data subjects involved."[41]

39. In 2018 Mauritius released its *Artificial Intelligence Strategy*,[42] which included a discussion of governance, concluding that there would be a need for formally updating data protection legislation, and recommending the installation of a Mauritius AI Council with appropriate stakeholders. AI strategies are an important opportunity for countries to explore broader, intersectional roles for NSO stakeholders, even if there are not yet broader horizontal integrations.

National Statistical Office data governance and data stewardship topics for future work

40. While there are many issues to address in data governance and stewardship, the following topics continue to be high priorities to consider for additional work.

A. The use of private sector data for government statistical purposes

41. Questions around government use of private sector data are increasingly important for NSOs and governments to address, particularly in light of increasing digitalization. Although the pandemic has increased private sector data-sharing activity, the use of private sector data has come under increasing legal and public scrutiny.[43] Early surveys of NSOs and discussions

[40] Act 20/2017, *The Data Protection Act 2017*, Government Gazette of Mauritius No. 120 of 23 December 2017. https://dataprotection.govmu.org/Pages/The%20Law/Data-Protection-Act-2017.aspx.

[41] Part IX, Miscellaneous. 44. Exceptions and restrictions. Act 20/2017, The Data Protection Act 2017, Government Gazette of Mauritius No. 120 of 23 December 2017. https://dataprotection.govmu.org/Pages/The%20Law/Data-Protection-Act-2017.aspx.

[42] *Mauritius Artificial Intelligence Strategy*, November 2018. https://mitci.govmu.org/Documents/Strategies/Mauritius%20AI%20Strategy.pdf.

[43] Private sector data utilized for research is the subject of significant interest. See: Chetty, Raj and Friedman, John and Hendren, Nathaniel and Stepner, Michael and Team, The Opportunity Insights, *The Economic Impacts of Covid-19: Evidence from a New Public Database Built Using Private Sector Data* (June 2020). NBER Working Paper No. w27431, Available at SSRN: https://ssrn.com/abstract=3637732.
See also: Findlay, Mark James and Loke, Jia Yuan and Remolina, Nydia and Tham, Benjamin, *Ethics, AI, Mass Data and Pandemic Challenges: Responsible Data Use and Infrastructure Application for Surveillance and Pre-emptive*

regarding this topic indicate that although the pandemic initially increased the statistical uses of private sector data under the auspices of the health emergency, legal barriers are still significant enough that expanded uses are not likely to continue at the same rate after the emergency use authorizations are lifted.

42. More work needs to be done to understand what measures can best facilitate ethical and legal collaboration and use of privately held data for statistical purposes.[44] NSOs have opportunities to conduct multistakeholder work with public sector stakeholders in this domain. Corporate stakeholders are important, as are members of the public whose data is being potentially utilized. An early model emerging in this regard is the work of Data Ventures, a project of Stats NZ, to ethically and transparently work with private sector data holders.[45]

B. Whole-of-government legal frameworks, particularly those that align cooperation with data authorities and NSOs

43. National legislation regarding NSOs has significant interactions with modern privacy and data protection legislation. These two ecosystems are different enough from each other that aligning these governmental data frameworks is a key area to explore and research. Alignment will need to fit the country context, and models may differ substantively.

44. More work on questions such as the following could be useful:

- What are the key junctures where alignment is possible, and necessary?
- What are the key use cases?
- What are the regional impacts and differences?
- Is there specific legislative language that has been effective, or not effective?
- How can countries that have parallel tracks of data protection legislation on one hand, and statistical legislation on the other, collaborate?
- Is the whole-of-government model going to work in all contexts? If not, are there scaled-back alternatives that could work better?

45. In the data protection context, *Convention 108+* [46] has been used as an accepted and widely ratified formal data governance tool to provide a "GDPR light" framework, which has

Tracing Post-crisis (May 4, 2020). SMU Centre for AI & Data Governance Research Paper No. 2020/02. http://dx.doi.org/10.2139/ssrn.3592283.

[44] Biancotti, Claudia and Borgogno, Oscar and Veronese, Giovanni Furio, *Principled Data Access: Building Public-private Data Partnerships for Better Official Statistics* (July 27, 2021). Bank of Italy Occasional Paper No. 629. http://dx.doi.org/10.2139/ssrn.3896309.

[45] Data Ventures, https://dataventures.nz.

[46] Convention 108+, *Convention for the protection of individuals with regard to the processing of personal data, Council of Europe*. Version: 2018. https://rm.coe.int/convention-108-convention-for-the-protection-of-individuals-with-regar/16808b36f1.

been particularly useful in the development context. Work to develop a similar type of lighter data governance mechanism for NSOs situated in a development context could be productive.

46. Work that addresses clearly defined and narrow intersections between NSO and Data Protection Authority activities could also be fruitful. These include aligning issue areas such as privacy impact assessments, algorithm impact assessments, and Artificial Intelligence (AI) and Machine Learning (ML) policies. There will likely be other useful intersections, depending on the country-level context. More work is needed to document where and what these might be, how successful collaborations function, and what models could potentially be replicated.

C. New or amended country-level Artificial Intelligence (AI) regulation or policy as an opportunity

47. In many countries with national data protection regulations, AI principles are in some cases being devised as largely to be enforced under the domain of Data Protection Authorities (DPAs). NSOs are in a position to be able to provide leadership on AI, or co-leadership. New AI regulation is an area where governments can create a meaningful whole-of-government scope in a more focused area, where NSOs will have a part in the development, implementation, and ongoing improvement of the AI policies.

48. Draft proposals that simply exempt or derogate NSOs from AI legislation are not necessarily the best solution and could lead to substantial policy fragmentation over time. Consideration of whole-of-government models will be important, and more work needs to be done on how a narrower band of focused work could provide a sandbox for collaboration between NSOs and DPAs.

D. Development contexts for National Statistical Offices (NSO)

49. In countries that are still developing capacity, work on ensuring that best practices are used concurrently with the framework of SDGs to nurture progress is key. However, more work is needed to determine which best practices will be most effective, and work that specifically identifies best practices that align with the SDGs as well as national data governance laws is still needed.

50. In *A World that Counts*, the authors presciently included a discussion of minimizing the risks and maximizing the opportunities of the data revolution.[47] The authors urged practitioners to determine methods of using data while safeguarding human rights, also mentioning

[47] *A World That Counts, Mobilizing the data revolution for sustainable development. Prepared at the request of the United Nations Secretary-General by the Independent Expert Advisory Group on a Data Revolution for Sustainable Development. N*ovember 2014. p. 6. https://www.undatarevolution.org/wp-content/uploads/2014/11/A-World-That-Counts.pdf.

algorithmic inferences. This was pioneering work. While much attention has been paid to data governance laws and NSOs, which have crucially important interactions, ongoing work regarding the SDGs and NSOs is also still needed.

51. Developing countries have been adopting national data protection legislation at a rapid pace. Much of this regulation is very similar to the GDPR in language and overall structure. While the advancement of data governance and protection is positive, it adds additional layers of work for the NSOs in these jurisdictions to find the most effective ways of navigating the intersections of NSO policy, national data protection legislation, and the SDGs. There is much potential for benefit if more work regarding this specific intersection of SDGs, NSOs, and data stewardship can shed light on best practices that are fit for purpose and the country-level context. It is a challenging nexus, and there is much that could still be learned.

E. Understanding and documenting the prerequisites for an NSO to take on additional roles as a data steward

52. The conference report from a high-level workshop on the data stewardship experience[48] concluded that there should be minimum prerequisites for NSOs to act as data steward or perform functions of this role, including having a clear vision of the national data strategy, the presence of legislation explicitly referring to and defining the NSOs role, and the human, financial, technical, and other resources to capably fulfill the role. This is a rapidly emerging area, and there is need for focused work to determine what the prerequisites are, for varying contexts.

[48] *High-Level Workshop on Data Stewardship experience with the ESS*, Conference Report and Summary, 31 March 2021.

Equity and inclusion: workstream 2 (WS2):

Lead(s): Departamento Administrativo Nacional de Estadística (DANE-Colombia); Global Partnership for Sustainable Development Data (GPSDD) (see Annex I for other members)

53. This chapter describes the initial outputs developed by the equity and inclusion workstream. Since its establishment, members have drafted two main outputs to achieve the deliverables of the workstream. The first one is a briefing blog on the relationship between equity and inclusion with the data stewardship concept, presented in the next section. The second document is the suggested terms of reference (see Annex II) that shall guide the drafting process for those contributing case studies for this workstream.

The Role of Data Stewards to Guarantee Equity and Inclusion

54. The 2030 Agenda[49] has set as one of its main principles the idea that no one can be left behind in the world's development process. As it is clearly stated by the UN Sustainable Development Group, "Leave no one behind" consists not only to reach the poorest of the poor, but also requires combating inequalities and discrimination, as they jeopardize people's agency. To comply with this commitment, the United Nations Statistics Division and other partners in the global statistical community, as well as many countries have adapted their work and efforts to ensure that data collection, processing and dissemination are reflecting everyone's realities, particularly for the most vulnerable – and usually underrepresented. The quality and pertinence of the insights that can be delivered to help the most vulnerable depends on the ability to provide and foster inclusion and equity in data collection, production, and dissemination.

55. Despite this pledge, the fulfilment of the principle is directly linked with the ability to overcome barriers that prevent the most vulnerable to benefit from data. As stated in the World Bank's World Development Report "Data for Better Lives Report", data have a dark side. Data access is becoming increasingly asymmetrical, creating environments that may incentivise perversive private and public practices. Market forces are likely to reward data agglomeration, which could lead to abuse of power market, anti-competitive practices, or even discrimination. On the other hand, government data agglomeration may help amass and maintain political power, discourage dissent, and even discriminate against some population segments.

56. In this context, the different members of the National Statistical Systems (NSSs), and particularly the National Statistics Offices (NSOs), are expected to operationalize data equity and inclusion within their governance and planning arrangements. Yet how can NSOs guarantee that everyone is on board on this path, in a context of increasingly less control over data

[49] *Transforming our world: the 2030 agenda for sustainable development*, United Nations. https://sdgs.un.org/2030agenda.

collection, processing, and dissemination? Although there is not a unique answer to this question, a consensus has been rising: NSOs must act as data stewards.

57. Nowadays, anyone can be a data producer: not because anyone can produce data properly, but because a data producer can come from nearly anywhere. With the unfolding of the Fourth Industrial Revolution (Industry 4.0),[50] new technologies have permitted firms, universities, public institutions –national and subnational–, and civil society organisations to collect and produce data to an extent that was only possible for NSOs in the past.

58. In that sense, apart from adapting technologies such as Artificial Intelligence (AI) or the Internet of Things (IoT), NSOs must shift their role as exclusively data owners and processors, to broadening their functions as stewards. As the head of the NSS, NSOs can guarantee the implementation of core values and principles in their statistics, but also oversee and promote data provided by other stakeholders that comply with pre-established standards, including on; equity, inclusion, quality, relevance, impartiality, misuse prevention, and confidentiality. In other words, to keep our promise of leaving no one behind we need to become guardians that prevent that any data producer crosses to the data's dark side.

59. Moreover, as data stewards, NSOs have the responsibility to improve better access to data. By an increasing access to data, a wider variety of users have found value in statistics. In the past, the value of collected data was solely concentrated in the data producers and some of their partners –particularly in NSOs and public institutions. As we enlarge data sources and improve processing methodologies, the insights derived from data are becoming endless. Academics and policymakers are finding innovative ways to rely on data, by developing new processing techniques to contribute to decision-making processes. Satellite images are being used to predict multidimensional poverty[51] or oversee illegal mining; national censuses are being used to geolocate and prioritize the most vulnerable amidst the pandemic,[52] and Machine Learning (ML) models are being put in place to correct ethnic groups' inclusion bias in sample-based statistical operations. Moreover, the private sector is currently relying on official statistics and Industry 4.0 technologies to produce new products and services. Data are becoming a public good and, as such, we must foster their responsible widespread usage and production.

60. Bearing this in mind, data stewards should focus on three tasks to foster equity and inclusion. First, NSOs must identify barriers and enablers to widespread use of data by different stakeholders in society. We must focus on issues such as data literacy and the development of

[50] *What is the Fourth Industrial Revolution?* World Economic Forum. 19 January 2016. https://www.weforum.org/agenda/2016/01/what-is-the-fourth-industrial-revolution/.
[51] Neal Jean, Marshall Burke, et al. *Combining satellite imagery and machine learning to predict poverty,* Sustainability and artificial intelligence lab, Stanford University. http://sustain.stanford.edu/predicting-poverty.
[52] See for example, *The Minority Health Social Vulnerability Index,* Centers for Disease Control and Prevention (CDC) and the Office of Minority Health (OMH), DHHS, which uses U.S. Census data. https://www.minorityhealth.hhs.gov/minority-health-svi/.

an ethical framework that allows us to navigate an increasingly decentralized data ecosystem. Second, it is paramount for data stewards that the increased use of data results in inclusive and equitable policies and practices. NSOs, in coordination with decision-makers and public institutions, need to address the limitations of different types of data to inform public policy. Finally, NSOs need to define their approach to foster the inclusion of different communities along the data value chain, generating and mainstreaming disaggregated data for both policymakers and the communities themselves. To reach a world without poverty and discrimination, the development path must be built and travelled together, particularly with the most vulnerable. Equity and inclusion also require involving everyone in the discussion, and, to this respect, that includes them participating in the collection, processing, and dissemination of the data used to improve their own and others' future.

61. This workstream will contribute to the overall goals of the Working Group on Data Stewardship, by discussing the trends described above and further refining the main actions to be taken by NSOs as data stewards in the promotion of equity and inclusion. As a first step, the workstream group will compile examples from NSOs and from the broader community by leveraging the Data Values Project led by the Global Partnership for Sustainable Development Data (GPSDD).

Sharing and collaboration: workstream 3 (WS3)

Lead(s): Instituto Nacional de Estadística y Censos (INDEC-Argentina); Departamento Administrativo Nacional de Estadística (DANE-Colombia) (see Annex I for other members)

63. In March 2021, a background document of "Approaches to data stewardship" prepared by the High-level Group for Partnership, Coordination and Capacity Building for statistics for the 2030 Agenda for Sustainable Development (HLG-PCCB) was presented during the 52nd session of the UN Statistical Commission[53]. This document was carried out based on case studies contributed by different National Statistical Offices (NSOs), which allowed, through the scoping methodology, to establish different approaches to the data stewardship concept. As a result of this document, better collaboration and data sharing came to be considered one of the "pillars" outcomes that make up the concept of Data Stewardship. This led to the creation of the Sharing and Collaboration workstream within the Working Group on Data Stewardship.

64. The work carried under this workstream has sought to contribute to furthering the understanding of one of the underlying elements of data stewardship, which is the data ecosystem. As such, the group strived to shed light on how do NSOs coordinate their activities with stakeholders of the data ecosystem to improve the use of data in society. While acknowledging that the existence of different legal frameworks across the globe, the workstream has worked on overcoming these barriers by focusing on a common understanding of the data ecosystem, identifying the participating stakeholders, and proposing sharing and collaboration mechanisms to enhance the role of NSOs as data stewards. In this sense, the workstream has guided its work under the following research questions:

- Are data coordination bodies part of or separate to National Statistical Systems (NSS) and NSO coordination bodies? How do they relate?
- What role, if any, should the NSO play in professional networks and secondments in the national data ecosystem?
- What are the challenges of data sharing agreements with different partners (i.e., Govt, private sector, legal capacity challenges, academia, etc.) in a data ecosystem? Can lessons from NSOs be applied in the wider data ecosystem?
- What does a standard agreement format look like to be applied to the new data ecosystem?

65. To answer them, the group decided to focus their work on three main deliverables:
- Developing an inventory of resources, which includes the good practices currently carried out by members on the matter.

[53] United Nations Statistical Commission. Approaches to data stewardship, Background document for the 52nd session, 1-3,5 March 2021, Item 3(a) (found here).

- Design and review of a guide and template(s) for the negotiation of data sharing agreements with members of the data ecosystem, taking into consideration a) the type of actor, b) the type of data (i.e., the confidentiality)
- Elaboration of a final document which includes recommendations to be reviewed by the working group, research questions for the work ahead, as well as refined outcomes of the other deliverables (inventory of resources and data sharing agreement templates).

66. This workstream has a direct connection with the main goals of the Working Group on Data Stewardship as it seeks to provide specific recommendations for better collaborating with stakeholders in the data ecosystem, and second, to overcome the legal barriers and make practical recommendations (i.e., collaboration agreements among members of the data ecosystem). In this way, the workstream will provide tools for the better understanding and demystifying the concept of Data Stewardship, which will also expand the concept of stewardship to other regions.

67. As challenges remain, mainly associated with achieving a wider regional representation from other members in the discussion, the Sharing and Collaboration workstream collected some initial examples (see Annex III) which systematizes different experiences of public and private sector agreements and data collaboration, providing insight of the general challenges that are being faced to focus further work. It is important to highlight that this document evidences the experiences of current Working Group members and does not aim to generalize these experiences. Further work will be done to achieve the objectives previously mentioned and give answer to the research questions.

68. Finally, workstream members recognise data sharing and collaboration is being discussed in different contexts under multiple groups. For this reason, the workstream will build bridges from other stakeholders and working groups that are organised by International Organizations, which are also working on the data stewardship concept, which will allow to broaden a common understanding of concepts within the data ecosystem and to provide better recommendations to its members. Some of these groups include:

- Data Collaboratives: is an initiative that seeks to go beyond the public-private partnership model, in which participants from different sectors — companies - exchange their data to create public value. It currently has a repository of cases and a model for the expansion and understanding of collaborative environments.
- UN Committee of Experts on Big Data and Data Science for Official Statistics (UN-CEBD): it seeks to promote the engagement with private sector, including common purpose, social good benefits and use of open-source communities and tools. In particular, it currently has different Regional Hubs to promote geographical collaboration for projects and education over Big Data.
- Economic Commission for Latin America and the Caribbean (ECLAC): During the 11th session of the Statistical Conference of the Americas held in November 2021, a Working

Group named “Diagnosis of the scope of the Data Stewardship concept in the role of Latin America and the Caribbean National Statistical Offices” was created whose objective is to advance the definition of a regional concept for data stewardship, proposing enabling elements for its implementation and mainstreaming by NSSs, and particularly by NSOs.

- United Nations Economic Commission for Europe (UNECE): In January 2021 UNECE created the Task Force on Data Stewardship to clarify the terms related to data stewardship and public data governance, and the tasks of NSOs that this may include in different settings. Its mandate has been given until June 2023.

Workstream process and method

69. Case studies on aspects of data sharing and collaboration (as in Annex III) will be the main source of information to inform the stock-take. The type of “data” referred to in the impact statement will be informed by the case studies collected. Different forms of data sharing and collaboration agreements being followed in data ecosystems will be used. In addition, it would be useful to collect examples from different regions of the globe, considering the different types of organizational circumstances, the political context, and the institutional configuration of a wide variety of countries, which would allow a holistic view of data sharing and collaboration.

Data stewardship and the city data agenda: workstream 4 (WS4)

Lead(s): Sustainable Development Solutions Network (SDSN) TReNDS (see Annex I for other members)

70. This workstream links the Working Group on Data Stewardship with those engaged in the Smart Cities' Initiative with the aim of fostering knowledge exchange, finding areas of mutual interest, and developing recommendations in these areas to improve and connect data stewardship at the national and cities level.

71. This workstream is led by the Sustainable Development Solutions Network TReNDS[54], reflecting TReNDS' experience in the examination of and connections with City Chief Data Officers (CDOs) for local SDG implementation, its analysis on the emergence of CDOs at the national level[55], and its previous research at the request of the High-level Group for Partnership, Coordination and Capacity Building for statistics for the 2030 Agenda for Sustainable Development (HLG-PCCB) on CDOs.

72. To date, the workstream has been led by a sub-group of TReNDS members[56] who have deep experience with the Smart City Agenda, National Statistical Offices (NSOs), and the UN Statistical Commission work processes[57]. This group has met four times from April 2021 through December 2021. The first meeting launched the idea of connecting data stewardship activities of the NSO and Cities' communities. Subsequent meetings developed the research questions (see section on "Workstream process and method") and a process and method to begin to answer these questions, assessed some initial findings, and determined whether continuing this work into 2022 was warranted. The remainder of this document provides more specifics on each.

The evolution of smart cities

73. In many places, smart city governments have been at the forefront of innovation around data for better civic outcomes. Thanks to technological advances, various physical devices connected to the Internet of things (IoT) network produce reams of data to optimize the

[54] SDSN's Thematic Network for Research on Data and Statistics (TReNDS) is a global data research network advancing policy and technical solutions for sustainable development (here).

[55] Research from TReNDS' "*Counting on the World to Act"* https://countingontheworld.sdsntrends.org/2019/getting-the-governance-right/.

[56] For TReNDS to fulfill its obligation to SDSN as a thematic network to mobilize global expertise in data for development, it relies on a small cohort of expert members drawn from across the global scientific, development, public, and private sector data communities. By design, these experts are respected scholars, practitioners, and policymakers from disparate communities, sectors, and institutions, in recognition that development decisions require data and evidence developed through multi-jurisdictional collaborations.

[57] Shaida Badiee (Open Data Watch), Lisa Bersales (University of the Philippines), Jeanne Holm (City of Los Angeles), Sarah Lucas (Hewlett Foundation), Francesca Perucci (UNSD), Eduardo Sojo (Centro de Investigación y Docencia Económicas, Mexico).

efficiency of city operations and services. These data—collected from citizens, devices, buildings, and assets — can be combined and analysed to monitor and manage a number of public services, including traffic and transportation systems, power plants, utilities, water supply networks, waste, and crime detection, to measure performance and benchmark against other cities, and to create dashboards to inform and connect with citizens.

74. The origins of smart cities can be traced to 1970s Los Angeles, which created the first urban big data project: "A Cluster Analysis of Los Angeles."[58] Yet, it wasn't until decades later in 1994 that Amsterdam evolved into what is considered the world's first smart city. And by the mid-2000s, initiatives supported by major ICT companies further catalyzed a proliferation of new smart cities, leading to an inaugural Smart City Expo World Congress held in Barcelona in 2011.

75. Since then, the smart city agenda has solidified its place among key global priorities and further formalized its practices with the establishment of platforms and multi-stakeholder collaboratives to share experiences, adopt common standards, and tackle common challenges. The G20 Global Smart City Alliance is one such example. Launched in 2019, this initiative unites municipalities and other stakeholders around a shared set of principles for the responsible and ethical use of smart city technologies. A second example, designed to foster urgent action to confront the climate change crisis, is the C40 Cities Alliance, in which mayors of nearly 100 world-leading cities collaborate to halve emissions within the decade. The Alliance has prepared a framework for cities to understand data management in the context of climate change that examines themes of data management strategy, data quality and assurance, leadership and governance, technology and systems, data use, and decision-making.

76. Leading smart cities are also using data to improve citizen engagement. For example, EmpowerLA, an initiative run by the City of Los Angeles, provides data and tools to help community leaders improve their advocacy strategies in municipal decision-making processes. This initiative is developing 'data liaisons,' citizens supporting neighborhood council leadership by helping to design maps, create data visualizations for digital outreach, highlight community issues, and create surveys to advocate for change in their communities.

77. Concurrently with the rise of data-driven smart cities, national and local governments have recognized that new technologies allow for unprecedented data collection, data integration, and analysis across social, economic, and environmental systems. In response, they are designing strategies to leverage the power of their data holdings for better policymaking and service delivery, including the establishment of a Chief Data Officer (CDO). Regardless of the size of their team or the scope of their responsibilities, CDOs share a common goal – to increase capacity for making data-driven decisions in government. A key aspect of a CDO's role is *Data*

[58] Los Angeles Community Analysis Bureau. The State of the City Report: A cluster analysis of Los Angeles. 1974.

Stewardship[59], as it lays the foundation for a more data-driven culture within cities to address the most pressing problems facing public servants/officials.

Workstream process and method

78. The initial steps taken by the workstream (April 2021) were to develop a background literature review as well as identify and develop a set of research questions that would drive the work program consistent with its role under the Working Group on Data Stewardship. They are as follows:

- Can a national-level data stewardship role be improved by drawing from the experiences at the city-level?
- What are the job descriptions, skills, and capabilities of CDOs at the city-level? Can national-level data stewardship draw from these city-level profiles?
- What are the options to establish a practical permanent link between work of the UN Statistical Commission and the Smart Cities' Initiative that would be mutually beneficial?
- Can the community of practices among smart cities be replicated at the national level to foster support and provide technical assistance consistent with the specific needs of national data stewards?
- Can action-oriented efforts of city-level data stewards inform policy-driven approaches at the national-level?

79. At its second meeting (May 2021), the workstream decided to commission a case study of interactions between city, state/provincial, and national data stewardship efforts. Eduardo Sojo volunteered to oversee and draft a case study[60] representing the experience of the city of León, Mexico, the findings of which are summarized in the next section.

80. Based on working group discussions and the lessons from the case study, TReNDS began conducting interviews with several city-level CDOs organized around the following themes and assumptions:

- ***The "Enabling" Environment***: Includes high-level support from political and executive branch champions; legal and regulatory factors, and organizational roles and responsibilities. This environment compels the CDO to function with supporting and competing forces in government (e.g., privacy and ethics, ombudsman office, etc.). The CDO will contend with both complementary and opposing pressures, but this dynamic might be helpful in a way, as it provides some structure. A CDO cannot operate as a CEO, as there are many complex relationships that need to be negotiated. Yet, having executive-level backing is often critical to achieving an impact.
- ***The Capabilities of the CDO/Data Steward***: We expect that the necessary capabilities of a data steward will fall under three categories: (1) technical skills (awareness of systems, data

[59] Wiseman, Jane: *Lessons from Leading CDOs: A Framework for Better Civics Analysis*, Civic Analytics Network, Ash Center for Democratic Governance and Innovation, January 2017 (found here).
[60] The full case study is available upon request from the SDSN TReNDS secretariat. mailto: trends@unsdsn.org

processing and analysis, methods and tools, etc.); (2) the ability to effectively work and influence across government (mindful of the characteristics and actors of the enabling environment described above); and (3) the ability to conduct outreach and external consultations. During the interviews, TReNDS asked each of the stewards to reflect on the relative importance of these capacities.

- ***Nurturing Modalities***: These are mechanisms that allow for using peer groups or communities of practice that facilitate knowledge exchange or mutual support.

81. With this framework, TReNDS' staff conducted four interviews to complement the findings from the León case study and the literature review:

- The CDO for Sydney, Australia who oversees both data compliance and is responsible for promoting data innovation. The CDO provided useful context for how they are advancing data stewardship through a network of existing individuals across city government and how they are using an open data platform to catalyze innovation.
- The Head of Data Analytics for Jakarta Smart City who described a rather impressive array of data applications that they've realized.
- The Senior Manager for Policy and Research for Durban, South Africa. Although the initial role was not as data specific, the current officeholder has transformed the position resembling that of a CDO. Durban is working to localize the SDGs and report on city progress, and this has been an important opportunity to advocate around better data. Out of all the interviews so far, this official offered the clearest insights on the difficulties of navigating the local data landscape.
- The Africa Open Data Collaborative and its Secretariat to better understand how informal collaboratives foster knowledge exchange and mutual support.

Methodological strengths and limitations

82. The approach adopted by this workstream to determine findings and develop recommendations relies on a mix of an in-depth case study (León, Mexico) and a small set of in-depth interviews with City-level CDOs complemented by experiences derived from a literature review. Although the number of interviews for this phase of work is relatively small, the concurring experiences drawn from the literature review should provide the reader confidence that our findings and initial conclusions are based on impartial evidence.

Initial findings

83. Although this work remains in its early stages, some common observations were identified and discussed by the workstream during their July and September 2021 meetings. This section provides initial findings from the case studies and interviews. We have anonymized some of the specific quotes from interviewees so that they can be presented below.

A. There is no one "mold" for city CDOs to advance data stewardship.

84. All three interviewees hold different titles, are situated within different parts of city government, and have diverse mandates and priorities. Additionally, their positions in the city government's organizational chart are highly context specific. For instance, one CDO runs an entire city government unit responsible for spatial information, data services, and the maintenance of city data archives; while the position was initially established to support compliance with data regulations, they have increasingly worked to demonstrate the added value of data through the creation of dashboards, as well as connecting open data tools with local business incubators.

85. Another official taking on CDO responsibilities oversees the data analytics for a smart city agency, and his team supports the local government with predictive modeling and data analysis for policy, while also working with cross-sector actors throughout the city to foster a wider data ecosystem. Starting with an analytical function made it easier for CDOs to play a service provision role than one that starts as a compliance function.

86. The third CDO is a city leader in research and policy, who recognized early on that success would depend on knowing where city data was located throughout government and has partially redefined their role to focus on bringing together existing data sources from across agencies to build new data products.

87. Evidence from the literature concur with these experiences. The CDO for the city of Reykjavík, Iceland has a great deal of autonomy for making decisions about data. As the position has been designed as a harbinger of change, it is housed in a department that facilitates change management[61]. In the Hague, a decentralized model is adopted where department-level data officers and stewards are organized with the organization's data community, which in turn is aligned to existing decision-making structures[62]. In the Indian city of Pune, which boasts the first city-level CDO in the country, the CDO reports directly to the Municipal Commissioner[63]. And in Durban, South Africa, although the city does not have a formal CDO, the strategy management office takes on this role because it helps departments think about the evolution of the municipality.

B. City CDOs break down data silos by demonstrating value to policymakers.

88. A majority of CDOs report entrenched control of data products by departments and divisions, often with a lack of understanding about the potential benefits of the data's value if it

[61] Óli Páll Geirsson. "Data Driven Culture." Origo hlaðvarpið. January 8, 2021. https://share.transistor.fm/s/426478a9.
[62] The Hague. Towards a Data-Driven and Responsible City: Data Strategy 2020-2022.
[63] Tata Trusts. (2019). India's First City Data Officer Recounting Our Learnings and Experiences from Pune. (found here).

is made more accessible. To break the silos, CDOs work hard to demonstrate the value of bringing datasets together.

89. For example, city leaders in Pune recognized that legacy data systems were operating in silos and lacked system integrators[64]. Further, the data collected and maintained was non-standardized and kept in separate databases, reducing the operational efficiency of the system at large. With the establishment of a CDO, Pune began treating data as a strategic asset. Moreover, the demonstration effect of Pune's CDO lead India's Smart Cities Mission to support 100 cities to become "smarter" through better data-driven decisions. These cities were able to use data analytics and evidence-based decision-making in their COVID-19 responses with data-driven city-level initiatives used to set up health facilities and telehealth services; GIS-based tracking systems to determine vulnerable populations in need of food supplies; contact tracing with usage of Geospatial Information Systems (GIS), mobile applications, self-registration platforms, and drone surveillance; Artificial Intelligence (AI) to monitor social distancing violations; disseminating information through social media platforms; and using online applications to manage delivery services.[65]

90. In Reykjavík, the CDO demonstrates value by creating an open dialogue with city policymakers. Here, the CDO works to inform them of data issues, but also develops a better understanding of policymakers' perspectives. Similarly, one CDO interviewed held a series of meetings with government colleagues to help them appreciate the wider benefits of data sharing, dedicating time to negotiating with those who were reluctant to open datasets that they had traditionally controlled. Additionally, another reported that all city data is owned by other departments, ministries, and government agencies. As such, the CDO encourages data sharing by demonstrating "clear value" that comes from pulling together data from different sources, providing analysis, and ideas on data visualizations and dissemination. In the Hague, *Creating Value with Data* was the first theme of the city data strategy[66].

91. From a functional perspective, one CDO interviewed felt the mindset of a data steward should focus less on ensuring compliance and more towards adding value to catalyze greater city-level data interoperability. This was especially important in this case, as the CDO office began in data registry management and compliance, thus the office faced a re-branding challenge as they moved towards a service-based role.

92. Successful CDOs described breaking down analytical silos to transform data into actionable information. Many recognized that their offices do not have the expertise in all thematic domains, which made working in partnerships with researchers and departmental

[64] Ibid.
[65] World Economic Forum. (2020). Technology and Data Governance in Cities: Indian Smart Cities at the Forefront of the Fight Against COVID-19 (found here).
[66] Digital Overheid Netherlands. (n.d.) Tanaquil Arduin: Datagedreven werken staat wat resultaten betreft nog in de kinderschoenen. (Tanaquil Arduin: "In terms of results, data-driven working is still in its infancy.")

experts essential. Further, CDOs reported making connections outside of government to realize new opportunities, including leading collaborations with actors from the private sector, industry, and academia, as well as international organizations, such as the UN, and local civil society. For example, Cape Town, South Africa established a data science unit to upskill internal colleagues in recognition that department's budgets for outsourcing are limited.

93. Many CDOs report that adding value requires understanding the needs of users inside government (primarily decision-makers) and the general public, which uses data to hold governments to account and advocate for better service delivery. For some CDOs, focusing on internal users was the priority. One CDO feels, "Data is useless when it is not being used to innovate to provide better government services".

94. However, others recognized the importance of both internal and external users and the challenge of balancing their resources to support both. One CDO noted civil society has become more innovative with data as more technical skills have become available. The City of Los Angeles's EmpowerLA, referenced earlier, works to improve the data skills of neighborhood groups to improve their engagement in city decision-making. Often, both must be nurtured. One CDO reported that initiatives often require the support of the city council and the public at large. "Only by working together will there be local action." Another noted that, other than on privacy issues, they don't distinguish between internal and external user groups when developing platforms and discoverable data systems. Finally, another CDO created a user group to do power Business Intelligence to generate demand.

95. Finally, city CDOs recognize that good intentions do not always deliver results. For example, one city devoted resources to making geospatial data more widely available, but this did not trigger greater data use or as much innovation as hoped for in terms of better decision-making.

C. City CDOs cannot add value without a supportive enabling environment.

96. Although there are differences, each of the officials interviewed underscored the importance of having an enabling environment. From a legislative perspective, one explained that their role benefits from state and national laws regarding data privacy and access to information.

97. Others identified political leadership as a key enabler of their success, with one highlighting the importance of executive-level backing for data initiatives and that those new data collaborations have been catalyzed by demand for local SDG reporting. In Los Angeles, it has long been recognized that the Mayor and Controller are both champions for improving data sources to drive decisions and improve accountability and trust in government[67]. Similarly, Reykjavik's CDO indicated that buy-in from the city council was critical to empowering his office.

[67] L.A. Mayor's blog on Improving Government (found here) and L.A. Controller's data stories and map (here).

Another interviewee also indicated that to gain political support for Sustainable Development Goals (SDGs), champions are appointed by city council resolutions who drive the data agenda.

98. However, there is equal evidence of gaps in legislative support from higher levels of government that impedes data-driven cities. For example, the León case study demonstrated that more needs to be done in Mexico. There is almost no reference to the law that regulates the National System of Statistical and Geographical Information (SNIEG) on interactions with local statistical systems or the relationship between the Mexican NSO (INEGI) and CDOs at state or municipal levels.

D. City CDOs require a mix of skills to deliver value.

99. Our research found that successful city CDOs require a mix of technical and interpersonal skills. In terms of technical capabilities, the interviews and literature indicate that the CDO's stewardship function requires specific "data knowledge" on cloud computing, data science analytics, data management, etc. They must also be familiar with data collection and production processes, as existing city-level data is produced, stored, and documented in an ad-hoc and unstructured manner. An understanding of how data produced for specific operational purposes can be translated for analytical purposes and evidence is also essential.

100. Enhancing data literacy within and outside their organization is also an essential technical skill. Stocktaking efforts, such as the work by John Hopkins University and Centers for Civic Impact provide ideas on data visualizations for city leaders to help encourage their residents to engage and understand open data [68]. Outreach efforts, such as Buenos Aries's Lab ODS 16+ is neighborhood-based and designed to use data tools to tackle mobility issues for women in the city and to improve their capacity to advocate for change[69]. In Jakarta, improving data literacy is a shared responsibility across data teams. Operationally, many people have been collaborating with them to scale up data literacy, and they want to improve data literacy at all levels across all agencies by building a dashboard that can track their progress.

101. Equally important are communications skills to highlight the value of data to policymakers and the capacity to work and influence across organizational boundaries. One interviewee noted his requirement to work with dozens of government agencies and adapt to the leadership style in each. Collaborating with external actors is also important. In Jakarta, the goal is to build a data ecosystem by working together with government agencies, as well as with other sectors, such as academia and the private sector.

[68] Bension, M. (2018). 6 Ways Your Data Visualizations Can Influence Decisions." John Hopkins University and Centers for Civic Impact (found here).
[69] Resnicoff, F. and Miodosky, M. (2020). How Buenos Aires Uses the SDGs to Advance Women's Rights: A Data-Driven Approach to Gender Equity in the Public Space. Center for Sustainable Development at The Brookings Institute (found here).

E. Establishing city CDO networks for cross-sector learning and collaboration is not always easy.

102. The majority of city CDOs recognized that awareness of other governmental data stewardship efforts is needed to leverage the value of city data. However, interviewees reported their experiences with alliances were mixed. One mentioned the smart city alliance to which his municipality is affiliated has been bureaucratic and heavily administrative-focused. Often, the alliance is more focused on policy rather than data support. Another mentioned that his main source of peer activity was through LinkedIn, eschewing formal alliances entirely. Some CDOs indicated a preference to work through the data science and technical community to focus efforts on specific problems and tasks rather than on more broad-focused large alliances.

103. Some CDOs also highlighted the need to continually invest in networking, working through in-person and virtual connections. Some experiences of similar collaboratives, such as the African Open Data Collaboratives, have been successful in using this format by focusing on capacity building, as well as educational and training workshops. Moreover, complementing virtual discussion with physical convenings helps develop tangible skills.

104. Coordination across city data agendas has been proven successful when the focus is on a specific goal. For example, the successful collaboration of C40 Cities to create a *City Climate Data Management Framework*[70] consists of five themes – data management strategy, data quality and assurance, leadership and governance, technology and systems, data use, and decision-making – helps practitioners understand data management in the context of the current climate situation.

105. There are other positive examples. The Yokohama Partnership of Resources and Technology is a public-private partnership to export Yokohama's experiences in sustainable urban development to other cities around the world[71]. It establishes partner cities that want to work towards achieving the SDGs at the local-level to share knowledge and technical assistance, co-create solutions, and involve private-sector partners. The success of Yokohama was highlighted by the Jakarta CDO we spoke with who mentioned its collaboration via the Smart Change Project – a two-year initiative fostering knowledge exchange to improve policymaking in Jakarta.

F. Integrating data stewardship efforts across levels of government remain the exception.

106. The León case study provides evidence that much more can be done to bring data stewards together across different levels of government. The study reveals the many ways statistical activities are coordinated between the Mexican national and state levels and

[70] C40 Cities. (2019). *City Climate Data Management Framework (*found here).

[71] Hashimoto, T. (2021). Supporting City-to-City Collaboration: How Yokohama is at the Frontier of City Development Cooperation and Public-Private Partnerships. Center for Sustainable Development at The Brookings Institute (found here).

documents the councils and laws that enable this collaboration. Unfortunately, the laws do not identify municipalities as a participant in these frameworks, even though many Mexican cities are taking steps to leverage value from their data holdings. The study concludes by recommending that Mexico establish a process of sustained knowledge sharing between CDOs in states, municipalities, and the NSO that would help to understand the use of data to inform better decision-making by local governments and find opportunities for improving the process or data dissemination, so that it is more 'fit for purpose'.

107. To advance collaborations in data stewardship across government levels, working on a common objective, such as achieving the SDGs, may help set priorities and establish working programs. The recent paper by Hiniker[72] provides suggestions for cities that want to localize the SDGs as a shared framework by conducting Voluntary Local Reviews.

What the findings suggest for National Statistical Offices (NSOs)

108. Although this work remains in its early stages, the findings on cities' approach to data stewardship point to some common recommendations that NSOs should heed when adopting data stewardship roles and fostering better data stewardship across the whole of government:

- ***Emphasize Creating Value from Data First***: The above findings indicate that the primary focus of city data stewardship emphasizes putting data to work to improve city decision-making and service delivery. This is consistent with the experience of some NSOs working in data steward role as reported in the *Approaches to Data Stewardship* UNSC background document. [73] Demonstrating how data improves government performance has created support for the city CDO role and is consistent with the role of NSOs during the pandemic – where using data for problem-solving was how NSOs added value during the COVID-19 pandemic[74]. However, the findings also suggest that NSOs are likely to expect resistance to improved data interoperability across government. Stewardship should emphasize how better cross-government data sharing leads to better decision-making and government service delivery.
- ***Expand to an Enabler of Data Quality Second:*** The findings suggest that emphasizing the NSO as a purveyor of data quality as the priority will not develop support from senior government officials. Clearly, NSO expertise in ethical use and privacy assurance will be welcomed once the NSO has indicated their objective to help solve problems, but NSOs should avoid falling into a data quality compliance function when acting as data stewards. It remains difficult to strike a balance between compliance and service in the broader organization of a national government.

[72] Hiniker, A. (2021). How to Align City Strategies With the SDGs: Embracing Common Language to Measure and Amplify Progress. Center for Sustainable Development at The Brookings Institute (found here).
[73] United Nations Statistical Commission. Approaches to data stewardship, Background document for the 52nd session, 1-3,5 March 2021, Item 3(a) (found here).
[74] United Nations World Data Forum (2021). Governing Data, Session TA5.14 (link to recording here)

- ***Use the Opportunity to Better Understand Whole-of-Government Use of Data to Improve NSO Products, Services, and the User Experience:*** Many city CDOs indicate that the array of data at their disposal is much greater – especially from sensors and data generated by citizen groups – than most NSOs have yet to be exposed to. In addition, NSOs will likely gain more insight into user requirements when contributing to national government data stewardship. This expanded access to user needs and new data sources provides NSOs with the opportunity to adjust their own products and services to improve their uptake and impact.
- ***When Developing Data Steward Networks for Cross-Sector Learning, NSOs Should Develop Common Tools to Address Global Priorities***: examples such as the C40 Cities' *City Climate Data Management Framework* and twinning arrangements for effective knowledge exchange (Yokohoma project) work best when fostering effective data stewardship collaborations.
- ***Work to foster a government-wide enabling environment to leverage the data as a strategic asset:*** This will benefit all actors in government with a role in leverage the value of government data.
- ***NSO leadership must be capable technically, as communicators, and to influence across organizational boundaries***.

Perspectives for future work

109. The findings of this workstream indicate that data stewardship activities at the city and national government levels could be mutually reinforcing. Unfortunately, the interviews and literature review did not find any concrete examples of knowledge exchange between these communities. In fact, interviewees felt they would benefit from such an exchange, and the León case study confirmed that this form of collaboration would benefit NSOs. Therefore, ***there is a clear need for an entity to actively pull the NSO and city CDO communities together to focus on capacity development and experience-sharing***. Discussing topics and modalities for such a collaboration will be the topic of our work plan for the coming year. Parties interested in sharing their experiences, participating in knowledge-sharing activities, etc. should contact SDSN TReNDS

Overall conceptual Framework on Data Stewardship: workstream 5 (WS5)

Lead(s): Open Data Watch (ODW); Statistics Poland (see Annex I for other members)

110. This workstream is co-lead by Statistics Poland and Open Data Watch (ODW) to establish a common understanding of the concept of data stewardship, as there are different interpretations of what constitutes data stewardship across different data communities and different uses of the terminology. This workstream strives to provide clarity on the conceptual framework and boundaries of a common terminology for data stewardship. It will ensure coherence across the other four workstreams.

111. This workstream will define the boundaries for data stewardship for official statistics and provide examples of what falls outside of those boundaries. A stocktake of existing definitions was undertaken to gain a better understanding of the current landscape and identify commonalities within these definitions. Initially, this review was limited to organizations and stakeholders within the development data community, with a particular emphasis on groups such as United Nations Statistics Division, the Partnership in Statistics for Development in the 21st Century (PARIS21), the United Nations Sustainable Development Solutions Network's Thematic Research Network on Data and Statistics (SDSN TReNDS), the World Bank, Open Data Institute, and the GovLab. However, due to a limited number of definitions from within the development data community, the review was expanded to include organizations outside of this space. This allowed the workstream members to review relevant and applicable definitions of data stewardship from a wider group of actors. Ultimately, this exercise included a review of 34 documents from the private sector, multilateral organizations, government entities, academia, and civil society organizations[75].

112. This stocktaking exercise found that data stewardship was not clearly defined and was often discussed in vague and abstract terms. It further emphasized the challenge of developing a one-size-fits-all definition of data stewardship for National Statistical Offices (NSOs) as each organization has differing mandates, capacity, and priorities. The bulk of the definitions analysed through the stocktaking exercise included key words that described the role of a data steward, these included:

- Provide data
- Curate data
- Facilitate data dissemination
- Establish trust
- Encourage data use
- Create regulations

[75] Please see the bibliography in Annex IV for a complete list of the documents reviewed.

113. Based on the outcome of the stocktaking exercise and follow up discussions, workstream members emphasized that there is no one-size-fits-all approach to data stewardship. Members agreed that in both its definition and application, data stewardship must be context specific. With that in mind, any conceptual framework developed by the workstream must be adaptable to countries with varying levels of capacity. As a next step, the workstream launched a short survey of members to identify common elements that must be included in a data stewardship framework. Workstream members were asked to provide input on the following questions:

What is data stewardship?

Why is it important?

How can stakeholders develop a well-functioning data stewardship and governance framework?

114. This survey yielded a total of five in-depth responses that provided a basis for discussion for the group. Most responses emphasized the following:

- Data stewardship includes governing the data ecosystem to improve the use and reuse of data for the public good.
- Data stewardship is the ethical and responsible creation, collection, management, and use of data.
- Data stewards, including NSOs, must facilitate coordination and cooperation between data providers and users.
- Data stewards ensure data protection, standardization, and quality to build and maintain trust.

115. Through follow up consultations with members, the workstream identified some common elements that must be included in the data stewardship framework for official statistics. These include a common understanding of the data assets that are being considered. These assets can be categorized as people (producers of statistics, data collectors, analysers, and users), technology (technical infrastructure), and processes (governance, laws, policies, and procedures) within a country's data ecosystem. Effective data stewardship ensures that these elements work harmoniously to increase trust in (and the value, use, and impact of) data for the public good. Within this framework, the data steward provides oversight and guidance, reduces risk, and increases collaboration across the system.

116. The workstream will strive to build on this framework by collaborating with efforts by the United Nations Economic Commission of Europe and other relevant initiatives of international organisations to develop a common definition. This may require follow-up on what is being undertaken within various statistical systems, as well additional consultations with key stakeholders and the development of a compendium of case studies on how data stewardship is operationalized within varies data and government systems. This collected knowledge will be used to create an inventory of best practices to serve as guidance for NSOs and other stakeholders.

Annex I: Organisational membership of each workstream

(as of 31 January 2022)

No	Workstream/ role	Lead(s)	Members
	Secretariat	United Nations Statistics Division (UNSD-DESA)	
1	Governance and legal frameworks	Statistics Poland/ World Privacy Forum	INSTAT-Albania; NSO-Malawi; Statistics Lithuania; Statistics Netherlands (CBS); Statistics New Zealand; Instituto Nacional de Estadística (INE-Spain)
2	Equity and inclusion	Departamento Administrativo Nacional de Estadística (DANE-Colombia); Global Partnership for Sustainable Development Data (GPSDD)	Statistics Canada; INEC-Ecuador; Statistics New Zealand
3	Sharing and collaboration	Departamento Administrativo Nacional de Estadística (DANE-Colombia); Instituto Nacional de Estadística y Censos (INDEC-Argentina)	Australian Bureau of Statistics (ABS); Instituto Nacional de Estadísticas (INE-Chile); Central Statistical Bureau of Latvia; Statistics Sweden; Statistics Netherlands (CBS); Statistics New Zealand
4	Data stewardship and the city data agenda	Sustainable Development Solutions Network (SDSN) TReNDS	Centro de Investigación y Docencia Económicas (CIDE), Mexico; City of Los Angeles; Open Data Watch (ODW); University of the Philippines (UP); William and Flora Hewlett Foundation; United Nations Statistics Division (UNSD-DESA)
5	Overall conceptual framework on data stewardship	Open Data Watch (ODW); Statistics Poland	Australian Bureau of Statistics (ABS); Federal Statistical Office of Germany (Destatis); Statistics New Zealand; Statistics Norway; United Nations Economic Commission for Europe (UNECE)
NA	Supported by	Statistik Austria; NBS-China; Statistics Estonia; Statistics Finland; Statistics Indonesia (BPS); CSB-Kuwait; Department of Statistics Malaysia (DOSM); NSO-Mongolia; Philippine Statistics Authority	

No	Workstream/ role	Lead(s)	Members
	Supported by	(PSA); Statistics Korea (KOSTAT); Office for National Statistics (ONS-UK); NBS-Tanzania; GSO-Viet Nam; Zimbabwe National Statistics Agency (ZIMSTAT); United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP); United Nations Economic and Social Commission for Western Asia (UNESCWA); United Nations Economic Commission for Africa (UNECA); United Nations Economic Commission for Latin America and the Caribbean (UNECLAC / CEPAL)	

Annex II: Guidelines to prepare case studies (WS2)

This document contains the guidelines for workstream members to draft case studies on how to address the equity and inclusion perspective as data stewards. This information will allow the workstream to systematize the different approaches that can be taken by other countries to foster equity and inclusion throughout the entire statistical cycle. Bearing this in mind, and to facilitate the information analysis, member countries are encouraged to comply with the following suggestions:

1. Case studies should be maximum three pages long.

2. The document should clearly justify why the presented experience is related to the data stewardship approach and how it is related to equity and inclusion perspective. The target group featured in the experience –ethnic groups, vulnerable communities, women, etc. – needs to be clearly defined.

3. The case studies should identify 1) the barriers and/or enablers to encourage the widespread use of data by the intervention group, 2) how was the intervention expected to result in the inclusiveness of the intervention group, and 3) which were the undertaken actions throughout the different statistical phases –planning, collection, processing, and dissemination.

4. When possible, country experiences should also describe the data governance schemes that allowed NSOs to lead and execute the interventions to foster equity and inclusion.

5. The case studies should describe, when possible, the different issues countries had to tackle to execute the actions contemplated by the interventions.
6. Finally, case studies should explicitly state unresolved barriers and challenges they have identified or foreseen in the promotion of equity and inclusion in official statistics.

Annex III: List of cases regarding sharing and collaboration (WS3)

(Table format based on C4DC[76] library)

Case Title	Parties involved	Description	Sector	Region	Link
The role of the Australian Bureau of Statistics in data governance and stewardship in Australia from a regulatory perspective (WP presented at the UNECE)	The Australian Government / The Australian Bureau of Statistics (the ABS).	*The Australian Government has introduced a range of policy initiatives in the statistical and data landscape, and recently proposed a regulatory initiative in the form of a new legislative data sharing scheme for public sector data. This paper will outline such developments and contributions made by the Australian Bureau of Statistics (the ABS). The paper will then examine two formative past legislative reforms that have shaped the role of the ABS as Australia's central statistical authority and data steward. The paper explores how the ABS has built on those reforms to maximise the value of data – firstly through expanding user access to microdata and secondly through developing a data integration framework and significant national integrated data assets.*	Institutionalism/ Government	Oceania	[Link]

[76] https://contractsfordatacollaboration.org/library/#list-of-all-example-agreements/?view_126_page=1

Case Title	Parties involved	Description	Sector	Region	Link
COVID-19 lessons learnt: recommendations for improving the resilience of New Zealand's government data system.	Statistics New Zealand / Tatauranga Aotearoa	*The Government Chief Data Steward commissioned Statistics New Zealand to develop a set of recommendations for improving the resilience of the New Zealand government data system, based on lessons learnt during the response to the COVID-19 pandemic. In relation to data sharing and collaboration, this report highlights the importance of data sharing agreements and relationships to enable an effective government response to a crisis. It highlights the need for adequate exchange mechanisms to support the secure management of sensitive data, and how access to data as part of the COVID-19 response was supported by previous investments in agreed standards and other data infrastructure. The report also highlights the importance of providing collaboration mechanisms to encourage more regular information sharing, and support communication and collaboration between agencies. Recommendations linked to the theme of data sharing and collaboration include investing in infrastructure that will support data exchange and revising existing data sharing agreements so that they are future-proofed and enable more effective data sharing in a crisis.*	Government	Oceania	[Link]
Understanding barriers to comparable and interoperable data	Statistics New Zealand / Tatauranga Aotearoa	*New Zealand's Open Data Charter Implementation plan currently focuses on the Charter principle of 'comparable and interoperable'. This principle was chosen as the initial focus as it is foundational to the other Charter principles. This report explores barriers currently preventing agencies from providing more open data that is comparable and interoperable.*	Government	Oceania	[Link]

Case Title	Parties involved	Description	Sector	Region	Link
UN Environment and Google partnering to monitor global surface water (*)	United Nations Environment Programme / Google	*This case study documents a successful data sharing agreement between a private company and an international organization dealing with global environmental data. Google and UN Environment signed a memorandum of understanding (MOU) in 2018 that formalized their collaboration around measures of surface water. Informed by interviews with the parties and the actual agreement text, this case study describes how the MOU was negotiated and highlights key elements from the MOU.*	Environment	East Asia and Pacific, Europe and Central Asia, Latin America and the Caribbean, Middle East and North Africa, North	[Link]
UNSD-DFID Project on SDG Monitoring: Data Sharing Arrangements and improved coordination of data flows within the national statistical system	UNSD	*The UNSD-DFID Project on SDG Monitoring, with its primary aim of making SDG indicators available to the broadest possible audience and strengthening the capacity of partner countries in the compilation and use of these indicators, places particular emphasis on the need for working mechanisms within the National Statistical Systems (NSS) for effective and efficient data sharing to facilitate data interoperability and collaboration, based on the Fundamental Principles of Official Statistics. 2 This guidance note provides some suggestions on how to develop and implement data sharing arrangements within the NSS, covering legal arrangements and to some extent the practical arrangements. Sample components are provided as modules that can be included in a data sharing*	[Not specified]	[Not specified]	[Link]

Case Title	Parties involved	Description	Sector	Region	Link
		arrangement document in accordance with a country's specific needs.			
Laying the Foundation for Effective Partnerships: An Examination of Data Sharing Agreements	SDSN TReNDS	*In the midst of the COVID-19 pandemic, data has never been more salient. COVID has generated new data demands and increased cross-sector data collaboration. Yet, these data collaborations require careful planning and evaluation of risks and opportunities, especially when sharing sensitive data. Data sharing agreements (DSAs) are written agreements that establish the terms for how data are shared between parties and are important for establishing accountability and trust. However, negotiating DSAs is often time consuming, and collaborators lacking legal or financial capacity are disadvantaged. Contracts for Data Collaboration (C4DC) is a joint initiative between SDSN TReNDS, NYU's GovLab, the World Economic Forum, and the University of Washington, working to strengthen trust and transparency of data collaboratives. This report serves to introduce the C4DC initiative, its DSA library, and provide collaborators with a more comprehensive understanding of how DSAs are applied in practice.*	[Not specified]	[Not specified]	[Link]
Covid-19 data and data sharing agreements. The potential of sunset clauses and sunset provisions	SDSN TReNDS / DataREADY	*The COVID-19 pandemic is currently ravaging societies and economies around the world. Its reach is unprecedented in modern times. As digital technologies have become more embedded in our lives, COVID-19 related data on incidence rates; the availability of medical supplies; and the location of vulnerable people, among others – are informing policymakers' responses around the world. Within this context, much of the data needed to track and trace*	Health	[Not specified]	[Link]

Case Title	Parties involved	Description	Sector	Region	Link
		patients and vulnerable people or monitor compliance with quarantines, curfews, and lockdowns is highly sensitive. This data is often derived from individuals' mobile phones or via remote sensors of various kinds. This document examines the potential of sunset clauses or sunset provisions to be a legally binding, enforceable, and hence accountable way of ensuring COVID-19 related data sharing agreements are wound down responsibly at the end of the pandemic. Sunset clauses stipulate how a piece of emergency legislation should come to an end. Sunset provisions are clauses in data sharing agreements that determine what will happen to the data at the end of the agreement.			
Guide to Sharing Economic Data in Official Statistics	UNECE	*Economic globalization is characterized by innovative global business arrangements and growing interdependence of economies. This raises severe challenges to statisticians in measuring and describing national, regional and global economic development. Global problems require global solutions. Indeed, data sharing emerged in these discussions as a game changer for statistical production. This guide provides tools and ideas to improve the quality of economic statistics by increasing cross-national and international data sharing for statistical purposes, while observing strict statistical confidentiality. A key aspect of the solution relates to the role of national statistical offices. They cannot rely on national data only but need to exploit the possibilities of using data collected by statistical authorities of other countries to produce better quality economic statistics. The other aspect of the solution is the sharing of innovative*	Economic Development	Europe	[Link]

Case Title	Parties involved	Description	Sector	Region	Link
		practices to understand and correctly record the activities of Multinational enterprise groups.			
Using mobile data for health monitoring: A Case Study of Data Sharing Between Ghana Statistical Services, Vodafone Ghana, and Flowminder Foundation (A Case Study by SDSN TReNDS for C4DC) (*)	Ghana Statistical Service (GSS) / Vodafone Ghana / Flowminder Foundation	*A data collaboration in 2018 between the Ghana Statistical Service (GSS), Vodafone Ghana, and Flowminder, enabled the GSS to access insights from mobile phone data to plan public health and sustainable development policies. This case study demonstrates how a government, and a private company were able to work with an intermediary partner to gain insights from sensitive data. As part of the collaboration, Vodafone Ghana provided access to pseudonymized telecommunications data free of charge, and Flowminder aggregated and analyzed the data on behalf of GSS. Initially, the parties had planned to form a non-binding agreement, but national regulators requested a formal agreement that addressed various data concerns. From the initial draft of the agreement provided by Vodafone Ghana to the final approval, negotiations took some 13 months. The negotiations were made especially challenging because GSS did not have its own legal counsel, and the process overlapped with the introduction of the General Data Protection Regulation (GDPR). Among other issues, the agreement addresses how the data will be aggregated, the parameters for the exchange of the data between the parties, data use limitations, data deletion, and the publication of analysis results. After signing the agreement in December 2018, the parties have since enjoyed a successful collaboration, and the mobile data being used by GSS has proven especially*	Health / Telecommunications	Sub-Saharan Africa	[Link]

Case Title	Parties involved	Description	Sector	Region	Link
		valuable during the current Covid-19 pandemic to document the impact of restriction measures in Ghana.			
Memorandum of Understanding Regarding Data Sharing (*)	UK Department for Communities and Local Government ("DCLG"), UK Department for Energy and Climate Change ("DECC")	*A memorandum of understanding signed in 2016 by the UK Department for Communities and Local Government and the Department for Energy and Climate Change about the sharing of fuel poverty data.*	Economic Development, Infrastructure	Europe and Central Asia	[Link]
Spawning Aggregation Data Sharing Agreement between and among Belize Audubon Society, Coastal Zone Management Authority & Institute, Fisheries Department, Friends of Nature, Green Reef, The Nature Conservancy, Toledo Institute for the Development and Environment, University of Belize, Wildlife Conservation Society, and World Wildlife Fund (*)	Belize Audubon Society, Coastal Zone Management Authority & Institute, Fisheries Department, Friends of Nature, Green Reef, The Nature Conservancy, Toledo Institute for the Development and Environment, University of Belize, Wildlife Conservation	*A data sharing agreement signed by several international NGOs, academic institutions, and government offices in Belize for pooling data about Spawning and fisheries.*	Environment	Latin America and the Caribbean	[Link]

Case Title	Parties involved	Description	Sector	Region	Link
	Society, World Wildlife Fund				
The process of the Colombian statistics office in the search for alternative data sources to complement the analysis about the gender gap corresponding to access and use of mobile phones devises and services.	Mobile operators (Movistar Telefónica) / DANE (Colombia)	*The National Statistical Office of Colombia, in its search for new sources of information, called "alternative sources" under the framework of data collaboration, has proposed a data sharing agreement with a mobile operator Telefonica Movistar, which seeks to carry out analyzes that measure the gender gap that exists in the access and use of mobile phone devises and services. This agreement is looking for a win-win scheme of work between the interested parties, that enables DANE to access demographic characteristics of the clients and information corresponding to its activity (CDR's) to calculate indicators of access and use disaggregated by sex. The mobile phone operator will enrich the own use of the client's data through the data that DANE could provide from the census and the integrations with the geostatistical framework. For preserving the statistical reserve of data, DANE proposed the design and implementation of an algorithm for gender identification of clients.*	Private Sector /Government	Latin America and the Caribbean	
Agreement Between Google LLC and NHSX (comprised of NHS England, NHS Improvement, and the Department of Health and Social Care) (*)	Google LLC, NHS	*An agreement signed by Google and the UK National Health Service in 2020 that allowed Google to assist with the COVID-19 pandemic response. Google was given access to certain data and provided analytical, technical, and advisory assistance to NHS for no charge.*	Health	Europe and Central Asia	[Link]

(*) Cases and documents obtained from Contract for Data Collaboration: https://contractsfordatacollaboration.org/

Supplementary details of examples provided in the table above

Case Title	The role of the Australian bureau of statistics in data governance and stewardship in Australia from a regulatory perspective
Parties Involved	The Australian Government / The Australian Bureau of Statistics (the ABS)
Description	The Australian Government has introduced a range of policy initiatives in the statistical and data landscape, and recently proposed a regulatory initiative in the form of a new legislative data sharing scheme for public sector data.
Link to Document	Link
Data Asset Contributor(s)	Government
Data Asset User(s)	Government
Shared Data Assets	Public sector data
Type(s) of Collaboration	Government agencies
Region(s)	Oceania
Sector(s)	Institutionalism/Government
Societal Value Proposition	Maximise the use of government data to benefit citizens
Operational Value Proposition	Enabling data use in a safe and secure environment
Associated SDG(s)	N/a

Case Title	COVID-19 lessons learnt: recommendations for improving the resilience of New Zealand's government data system.
Parties Involved	Statistics New Zealand / Tatauranga Aotearoa
Description	This report highlights the importance of data sharing agreements and relationships to enable an effective government response to a crisis. It highlights the need for adequate exchange mechanisms to support the secure management of sensitive data, and how access to data as part of the COVID-19 response was supported by previous investments in agreed standards and other data infrastructure.
Link to Document	Link
Data Asset Contributor(s)	Government
Data Asset User(s)	Government
Shared Data Assets	Public sector data
Type(s) of Collaboration	Government agencies
Region(s)	Oceania

Sector(s)	Government
Societal Value Proposition	Meeting data needs efficiently and enabling data use in a safe and secure environment
Operational Value Proposition	Enabling data use in a safe and secure environment
Associated SDG(s)	N/a

Case Title	Understanding barriers to comparable and interoperable data.
Parties Involved	Statistics New Zealand / Tatauranga Aotearoa
Description	New Zealand's Open Data Charter Implementation plan currently focuses on the Charter principle of 'comparable and interoperable'. This principle was chosen as the initial focus as it is foundational to the other Charter principles. This report explores barriers currently preventing agencies from providing more open data that is comparable and interoperable.
Link to Document	Link
Data Asset Contributor(s)	Government, NGOs, Private sector
Data Asset User(s)	Government, NGOs, Private sector
Shared Data Assets	Observed Data
Type(s) of Collaboration	Datasets integration
Region(s)	Oceania
Sector(s)	Government
Societal Value Proposition	Creating a data system where datasets can integrate and systems can communicate, with little effort, establishes a basis for the other principles to be more easily achieved.
Operational Value Proposition	Understanding barriers to comparable and interoperable data
Associated SDG(s)	N/a

Case Title (*)	Memorandum of Understanding Between the United Nations Environment Program and Google LLC
Parties Involved	Google LLC, United Nations Environment Programme (”UN Environment”)
Description	A memorandum of understanding signed by UN Environment and Google in 2018 for collaborating on environmental data products, with an initial focus on surface water data for SDG reporting.
Link to Document	Link
Data Asset Contributor(s)	Private Sector
Data Asset User(s)	NGOs and International Organizations
Shared Data Assets	Inferred Data

Type(s) of Collaboration	Research Partnerships
Region(s)	East Asia and Pacific, Europe and Central Asia, Latin America and the Caribbean, Middle East and North Africa, North America, South Asia, Sub-Saharan Africa
Sector(s)	Environment
Societal Value Proposition	Improving Governance and Decision Making
Operational Value Proposition	Improved Situational Awareness and Response Capabilities
Associated SDG(s)	6. Clean Water and Sanitation

(*) Cases and documents obtained from Contract for Data Collaboration: https://contractsfordatacollaboration.org/

Case Title	UNSD-DFID Project on SDG Monitoring: Data Sharing Arrangements and improved coordination of data flows within the national statistical system
Parties Involved	UNSD / DFID
Description	This guidance note provides some suggestions on how to develop and implement data sharing arrangements within the NSS, covering legal arrangements and to some extent the practical arrangements.
Link to Document	Link
Data Asset Contributor(s)	Private Sector, NGOs and International Organizations
Data Asset User(s)	National Statistical Systems
Shared Data Assets	Inferred Data
Type(s) of Collaboration	Data Sharing Arrangements
Region(s)	N/a
Sector(s)	Institutionalism/Government
Societal Value Proposition	Improving Governance and Decision Making
Operational Value Proposition	Improved Situational Awareness and Response Capabilities
Associated SDG(s)	N/a

Case Title	Laying the Foundation for Effective Partnerships: An Examination of Data Sharing Agreements.
Parties Involved	SDSN TReNDS
Description	This report introduces C4DC and its DSA library. It demonstrates how the library can support the data community to strengthen future data collaborations by showcasing various DSA applications and key considerations.
Link to Document	Link

Data Asset Contributor(s)	N/a
Data Asset User(s)	N/a
Shared Data Assets	N/a
Type(s) of Collaboration	Data Sharing Arrangements
Region(s)	N/a
Sector(s)	Institutionalism/Government
Societal Value Proposition	Improving Governance and Decision Making
Operational Value Proposition	Improved Situational Awareness and Response Capabilities
Associated SDG(s)	N/a

Case Title (*)	Covid-19 data and data sharing agreements. The potential of sunset clauses and sunset provisions.
Parties Involved	SDSN TReNDS and DataReady Limited
Description	This brief examines the potential of sunset clauses or sunset provisions to be a legally binding, enforceable, and hence accountable way of ensuring COVID-19 related data sharing agreements are wound down responsibly at the end of the pandemic.
Link to Document	Link
Data Asset Contributor(s)	N/a
Data Asset User(s)	N/a
Shared Data Assets	N/a
Type(s) of Collaboration	COVID-19 Data and Data Sharing Agreements
Region(s)	N/a
Sector(s)	Health
Societal Value Proposition	Improving Governance and Decision Making
Operational Value Proposition	Improved Situational Awareness and Response Capabilities
Associated SDG(s)	3. Good Health and Well-being

Case Title	Guide to Sharing Economic Data in Official Statistics
Parties Involved	UNECE
Description	This Guide provides tools and ideas to improve the quality of economic statistics by increasing cross-national and international data sharing for statistical purposes, while observing strict statistical confidentiality.
Link to Document	Link

Data Asset Contributor(s)	N/a
Data Asset User(s)	N/a
Shared Data Assets	Economic Data
Type(s) of Collaboration	Sharing Economic Data in Official Statistics
Region(s)	Europe
Sector(s)	Economic Development
Societal Value Proposition	Improving Governance and Decision Making
Operational Value Proposition	Improved Situational Awareness and Response Capabilities
Associated SDG(s)	8. Decent Work and Economic Growth

Case Title (*)	Agreement Between Vodafone Foundation and Ghana Telecommunications Company Limited (Trading as Vodafone Ghana) and Ghana Statistical Service and Stiftelsen Flowminder (Flowminder Foundation)
Parties Involved	Vodafone Foundation and Ghana Telecommunications Company Limited ("Vodafone Ghana"), Ghana Statistical Service ("GSS"), Stiftelsen Flowminder ("Flowminder Foundation")
Description	A Data Collaboration in Ghana has allowed the Statistical Service (GSS) to access insights from mobile phone data for planning public health and sustainable development policies. Vodafone Ghana provided access to its anonymized telecommunications data free of charge, and Flowminder has analyzed and aggregated the data on behalf of GSS. After signing in December 2018, the parties have had a successful collaboration, and the mobile data has been used by GSS to document the impact of restriction measures during the COVID response.
Link to Document	Link
Data Asset Contributor(s)	Private Sector
Data Asset User(s)	Government, NGOs and International Organizations
Shared Data Assets	Observed Data
Type(s) of Collaboration	Trusted Intermediaries
Region(s)	Sub-Saharan Africa
Sector(s)	Health, Telecommunications
Societal Value Proposition	Improving Governance and Decision Making
Operational Value Proposition	Improved Situational Awareness and Response Capabilities
Associated SDG(s)	3. Good Health and Well-being

(*) Cases and documents obtained from Contract for Data Collaboration: https://contractsfordatacollaboration.org/

Case Title (*)	Memorandum of Understanding Regarding Data Sharing
Parties Involved	UK Department for Communities and Local Government ("DCLG"), UK Department for Energy and Climate Change ("DECC")
Description	A memorandum of understanding signed in 2016 by the UK Department for Communities and Local Government and the Department for Energy and Climate Change about the sharing of fuel poverty data.
Link to Document	Link
Data Asset Contributor(s)	Government
Data Asset User(s)	Government
Shared Data Assets	Observed Data
Type(s) of Collaboration	Data Cooperatives or Pooling
Region(s)	Europe and Central Asia
Sector(s)	Economic Development, Infrastructure
Societal Value Proposition	Improving Governance and Decision Making
Operational Value Proposition	Knowledge Transfer Between Sectors
Associated SDG(s)	7. Affordable and Clean Energy

(*) Cases and documents obtained from Contract for Data Collaboration: https://contractsfordatacollaboration.org/

Case Title (*)	Spawning Aggregation Data Sharing Agreement between and among Belize Audubon Society, Coastal Zone Management Authority & Institute, Fisheries Department, Friends of Nature, Green Reef, The Nature Conservancy, Toledo Institute for the Development and Environment, University of Belize, Wildlife Conservation Society, and World Wildlife Fund
Parties Involved	Belize Audubon Society, Coastal Zone Management Authority & Institute, Fisheries Department, Friends of Nature, Green Reef, The Nature Conservancy, Toledo Institute for the Development and Environment, University of Belize, Wildlife Conservation Society, World Wildlife Fund
Description	A data sharing agreement signed by a number of international NGOs, academic institutions, and government offices in Belize for pooling data about Spawning and fisheries.
Link to Full Agreement Text	Link
Data Asset Contributor(s)	NGOs and International Organizations, Government, Academia
Data Asset User(s)	NGOs and International Organizations, Government, Academia
Shared Data Assets	Observed Data
Type(s) of Collaboration	Data Cooperatives or Pooling

Region(s)	Latin America and the Caribbean
Sector(s)	Environment
Societal Value Proposition	Improving Governance and Decision Making
Operational Value Proposition	Knowledge Transfer Between Sectors
Associated SDG(s)	14. Life Below Water

(*) Cases and documents obtained from Contract for Data Collaboration: https://contractsfordatacollaboration.org/

Case Title (*)	Agreement Between Google LLC and NHSX (comprised of NHS England, NHS Improvement, and the Department of Health and Social Care)
Parties Involved	Google LLC, NHS
Description	An agreement signed by Google and the UK National Health Service in 2020 that allowed Google to assist with the COVID-19 pandemic response. Google was given access to certain data and provided analytical, technical, and advisory assistance to NHS for no charge.
Link to Document	Link
Data Asset Contributor(s)	Private Sector
Data Asset User(s)	Government
Shared Data Assets	Data Science Expertise
Type(s) of Collaboration	Intelligence Products
Region(s)	Europe and Central Asia
Sector(s)	Health
Societal Value Proposition	Improving Governance and Decision-Making
Operational Value Proposition	N/a
Associated SDG(s)	3. Good Health and Well-being

(*) Cases and documents obtained from Contract for Data Collaboration: https://contractsfordatacollaboration.org/

Annex IV: Bibliography of sources describing data stewardship (WS5)

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